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Editorial Notes

The Domestic Market

RECENTLY in these columns we suggested that the Gas Industry has not appreciated as it should the fact that it is supplying the requirements of a fluid ever-changing market, that it will flounder badly if it regards this market as being static, and that it needs a great deal more quantitative information of what is taking place in the domestic heating field, a surer knowledge of how the changing habits of the people and the sway of public opinion will influence the future sales of gas and coke. Among the influences at work is the growing public demand for a cleaner atmosphere. Then the public to-day demands a greater standard of comfort and convenience, a standard which is, of course, being reflected by the development of our Industry. We may recall that in February last Dr. E. W. Smith suggested the setting up of a "bureau of economics" within the Industry to study every phase of the Industry from the economic point of view, to investigate the trend in connection with the coke-gas ratio, the relationship between costs of production and selling prices, the effect of changes in the habits and tastes of consumers, and so on.

In view of the foregoing it is with gratification that we find a similar trend of thought expressed by Mr. Stephen Lacey yesterday in his Presidential Address to The Institution of Gas Engineers. The need for the correlation of facts on which commercial policy should be based has given rise to market and statistical research, in which there is much yet to be done for the Gas Industry to ensure that time, energy, and money are spent to the best advantage and the best use is made of scientific research. On several occasions we have called attention to the magnitude of the domestic heating market and have urged the objective of replacing the 25 million or so tons of raw coal now burned in the domestic hearth by smokeless fuels—either gas or coke. In a Paper to be presented by Mr. C. A. Masterman at the Institution Meeting the Author sets out an important statement in regard to annual domestic heat requirements. The total domestic heat requirements per head of population are shown to be 334 therms per annum, of which coal is responsible for 72%, smokeless solid fuels 18·5%, gas 7·6%, kerosene and fuel oil 1·6%, and electricity 0·3%. Taking into account the efficiencies of utilization of the different fuels, the useful heat per head of population per annum is estimated to be 67·5 therms, accounted for by coal 53·2%, smokeless solid fuel 23·1%, gas 18·8%, oil 3·7%, and electricity 1·2%. In other words, even to-day over two-thirds of the heat supplied for domestic use is in the form of raw coal. This is the market which lies before the Gas Industry in the domestic field alone.

The ideal solution of the domestic heating problem is, of course, the wholesale substitution of raw coal by gas; and it is right that our Industry should look ahead and investigate, as it is doing, the possibilities of complete gasification under pressure. The fact remains, however, as we have stressed previously, that there is a great discrepancy between the cost of therms in the form of coke and therms in the form of gas when, by present methods of carbonization, the cheapest gaseous therm is made; and we have emphasized the need for organizing effectively for selling coke. Mr. Lacey shares our view. "Gas," he observed in his Address yesterday, "is the ideal fuel, and we should look forward to the time when the use of solid fuel of any kind will be a thing of the past. But no good would come of burking the fact that until gas can be sold at a lower average price than at present the demand for smokeless solid fuels in place of coal will continue, and should be encouraged. There is nothing inconsistent, therefore, in striving for the ideal of complete gasification of coal and, in the meantime, doing everything possible to increase the market value of gas coke by technical improvements in coke and coke burning appliances, and by the application of sales methods not less enterprising and intelligent than those applied to the sale of gas."

For long we have advocated collaboration in research, and we are glad that Mr. Lacey in his Address mentioned that the Research Executive Committee of the Institution is planning to establish closer collaboration than in the past with other research organizations, in this country and abroad, and thereby, at relatively little additional expense, greatly to enlarge its field of investigation. And, said Mr. Lacey, the most fruitful research in relation to

expense is not necessarily obtained by the maintenance by the Institution of a permanent research staff. The time may come, he hinted, when to a greater extent than in the past the Institution may decide to make grants for particular items of research to be carried out, within definite terms of reference, in such laboratories within and without the Gas Industry as may seem most capable of producing the best results.

Transport and the Gas Industry

THERE can be little doubt that during the present Parliamentary Session much will be heard with regard to the subject of Transport, whether by rail or road. The Railway Companies propose to apply to the Railway Rates Tribunal for authority to increase all passenger fares and traffic rates by some 5%. The increase would, of course, apply to the rates charged in respect of coal, coke, and patent fuel.

There is no doubt that these proposals will be most unacceptable at the present time to the industries of the Country, which will, with considerable force, urge that railway rates are to-day, on the average, well above 60% over the pre-war charges. On the other hand, the Railway Companies will contend that in 1920 a standard revenue was fixed by Parliament, and that owing to industrial depression and other causes they have never been able to earn anything like the amount so fixed. Further, the Railway Companies, like the Gas Industry, have to face heavy increases in the price of coal, and they are met with demands for a rise in wages and salaries.

It cannot be denied that the difficulties of the Railway Companies are substantial, but there are considerable doubts as to whether these difficulties can be solved by the mere raising of rates. The prosperity of the railways is linked up with the general prosperity of the Country, and the Railway Rates Tribunal, when it comes to consider the matter, will no doubt give full weight to the provisions of the Railways Act, 1920, which direct them when fixing rates "to have regard to the means which in their opinion are best calculated to ensure the maximum development and extension in the public interest of the carriage by railway of merchandise."

In dealing with the railways it is impossible to ignore their chief competitors—the road hauliers. In this connection reference may be made to the Report of the Committee on the Regulation of Wages and Conditions of Service in the Road Motor Transport Industry. As is well known, the Road and Rail Traffic Act, 1933, initiated the system of licences for road transport, under which three classes of carriers' licences are granted. Briefly, A and B licences authorize the holders to carry goods for hire or reward, while the C licence entitles the holder to use the authorized vehicle for the carriage of goods in connection with any trade or business carried on by him, but does not authorize the use of the vehicle for the carriage of goods for hire or reward. It is one of the conditions for the granting of an A or B licence that fair wages shall be paid, and in 1934 a National Joint Conciliation Board was appointed for the purpose of determining wages, hours, and working conditions in the road transport industry so far as A and B licence holders are concerned. On the other hand the law required no fair wages conditions to be attached to the granting of a C licence.

Difficulties have arisen as a result of these provisions, particularly as the road haulier who worked for hire under the A and B licences complained that he was subject to onerous conditions with regard to wages which were not applicable to his competitor the C licence holder. This was the main problem with which the Committee had to deal and evidence was heard from a variety of sources, including the Gas Industry. The Railways not unnaturally pressed for further restrictions to be placed upon C licence holders and their case was supported by the A and B licence holders.

The complexity of the problem was increased by the variety of the conditions under which C licence holders carry on their business. All such holders carry goods, not for hire or reward, but in pursuance of their own business. They vary, however, from the small shop keeper to the vast organization of a large public utility undertaking which may own many hundreds of vehicles. In the case of the small shopkeeper the driver of the vehicle may work for such wages as may be fixed between himself and his employer, while the servants of the public utility would be entitled to wages negotiated nationally through their joint Industrial Council. Another important aspect of the case is that for a considerable number of drivers employed by gas undertakings the work of driving is intermittent only, and the driver may be employed for part of his time on work unconnected with driving—*e.g.*, as a gas fitter.

Having surveyed the evidence placed before them, the Committee have come to the conclusion that the wages of drivers employed by C licence holders should be regulated, but that they should not be regulated by the same machinery as that which operates in the cases of A and B licence holders. It is suggested that, while a fair wages clause should be made a condition of granting a C licence, the C licence holder shall be deemed to be paying fair and proper wages if he elects to observe the wages and conditions which have been determined by joint agreements between employers and accredited representatives of the workers.

The Report will be one of the matters relating to transport which will shortly engage the attention of Parliament, and if its terms are incorporated in legislation it does not appear that the effect upon the Industry will be detrimental.

Refractories Research

MANY of our readers will have followed with keen interest the series of articles on refractories which Mr. A. T. Green, Director of the British Refractories Research Association, has contributed to *West's Gas*. The concluding article in this informative and well-written series is published in the current issue of *West's Gas*, and in it the Author discusses testing and specifications and comments generally on the value of research such as that conducted by the Association. To the Gas Industry, refractories are definitely "key" products; and the co-operative research carried out by the B.R.R.A. has led to vast improvements in the quality and suitability of refractory materials employed on gas-works and has been the means of effecting great economies. The Gas Industry, of course, played a major rôle in the establishment of the Association and throughout has supported its activities financially. That the money spent in this direction has been repaid in full measure is generally acknowledged; modern methods of high temperature carbonization could not have been put into practice without these improvements in the manufacture of refractory materials. From the inception of the Association in 1920 the Refractory Materials Joint Sub-Committee of the Institution, while

maintaining a virile individuality, has co-operated with the Association, has guided its special interests, and has allowed its investigations to be merged with the general research programme to mutual advantage.

A few weeks ago, discussing the value of and necessity for team-work research and investigation, we queried whether we should not as an Industry seek the assistance of the Department of Scientific and Industrial Research, which attaches so much importance to the development of the research association movement. In our opinion the difficulties in the path of previous approaches should be considered anew in the light of recent progress. Cannot these difficulties be overcome? We can surely with profit at least aim at their solution. Considering the vast and growing importance of the Gas Industry to the nation in times of peace and of its equally obvious importance as a factor in national defence, is it too much to hope that the D.S.I.R. would lend a more sympathetic ear than formerly to our Industry's claims and reasonable requests? The British Refractories Research Association is a relatively small body of its kind; it has amply demonstrated, however, the worth to industry of co-operative research. The Association is making a special and concentrated study of the processes of manufacture of refractory materials and their conditions of use; and, as we have said, the advances in these products are directly attributable to this work, which, including the prosecution of fundamental research, is making a solid technical foundation for the refractories industry in this country. Mr. Green, in the contribution to which we have referred, mentions that the need for co-operation in industrial research was evident from the early days of scientific questioning; in 1775 Josiah Wedgwood proposed the formation of a public experimental company, a kind of co-operative research association, the object of which was to further the development of ceramics. Yet the principle has only been adopted during the past decade or so, and only then with the assistance of the State.

The Specifications for Refractory Materials for Gas-Works issued by The Institution of Gas Engineers have been of very great value. The latest of these specifications were published in 1934, and were prepared by the Refractory Materials Joint Sub-Committee of the Institution and the Society of British Gas Industries, together with representatives of the B.R.R.A. They have undoubtedly led to an improvement of the texture of firebricks and silica products and an increase in the maximum temperature of the firing operation to which these products are subjected in manufacture. Where the specifications alone are accepted as the basis of selection the user is assured that refractoriness is adequate, that after-contraction or expansion is low, and that the material is true to size. The specifications are neither elaborate nor rigid, for, as Mr. Green points out, our knowledge of many aspects of the subject is incomplete and the stage of the science based on an adequate appreciation of all the factors relating to the use of refractories has not been reached. However, the tests indicated in the specifications are an essential part in the efficient utilization of refractory materials; and we have to thank the manufacturers for their co-operation in meeting the demands of the carbonizing industry for improved products.

Personal

Mr. A. KENNEDY, Commercial Manager of the Parkinson Stove Company, Ltd., was recently the recipient of a silver teaset and silver cigarette box upon his relinquishing this position to take up a managerial post in Lancashire.

The presentation was made by Mr. R. J. Rogers, Managing Director, on behalf of the Staff and Representatives.

* * *

Mr. RUFUS ELLIS, Engineer and Manager of the Birstall U.D.C. Gas Undertaking for the past twenty years, has brought to an end a 36 years' connection with the undertaking by retiring on pension now that Birstall, as already announced in the "JOURNAL," has become amalgamated with the Borough of Batley. Mr. Ellis was last week the recipient of a presentation from his colleagues. The presentation was made by Mr. A. H. Glover, the last Chairman of Birstall Gas Committee. Mr. H. N. Gaunt, Chairman of the Batley Gas Committee, presided.

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Alderman J. J. THOMAS, J.P., F.G.S., M.I.Min.E., Chairman of the Kendal Gas and Water Committee, who has served on the Borough Council for over 30 years, has been made an Honorary Freeman of the Borough.

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At their meeting on May 25 the Directors of the Exeter Gaslight and Coke Company elected Mr. W. N. WESTLAKE, who, as announced recently in these columns, has intimated his wish to retire from the position of Engineer and General Manager, to a seat on the Board, to date from the time he relinquishes his present position.

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Mr. F. H. JAMES, Manging Director of the Imperial Continental Gas Association, has been elected Deputy-Chairman.

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Mr. A. D. COUBROUGH, Manager, Inverbervie Gas Department, has been appointed to a similar position at Biggar, Lanarkshire. Mr. Coubrough has been Manager at Inverbervie since December, 1929.

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After some years as a draughtsman with the Stockton-on-Tees Gas Department, Mr. T. D. OLIVER has been appointed Engineering Assistant to the Burnley Gas Department.

We learn that Mr. F. BOSTOCK has been appointed a Deputy-Lieutenant for the County of Northamptonshire. Mr. Bostock is Chairman of the Northampton Gas Light Company. A son, Mr. Neville Bostock, is a Director of the Northampton Gas Light Company.

Obituary

Mr. HENRY ANGUS RAINE, who succeeded to the Chairmanship of the Durham Gas Company on the death of Mr. George Chapman, has died at Shincliffe at the age of 78.

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The day after he had attended the Conference of the Managers of the General Gas and Electricity Company, Ltd., which was reported in the "JOURNAL" last week, Mr. A. MILNER, Manager of the Soham and District Gas Company's Works at Soham, Cambs., died on May 20. With twenty-five years' service to his credit, Mr. Milner was the senior Manager present at the Conference.

Forthcoming Engagements

June.

7.—W.G.C.—Executive Committee Meeting, 2.30 p.m.
9.—COKE SALESMEN'S CIRCLE.—Visit to Crane, Ltd., Ipswich.
9.—ASSOCIATION OF STATUTORY INSPECTORS OF GAS METERS.—Annual General Meeting, County Hall, Westminster Bridge, 10 a.m. Visits to the Gas Meter Testing Office, Kennington, and Smith Meters, Ltd., Streatham.
10.—ASSOCIATION OF STATUTORY INSPECTORS OF GAS METERS.—Visit to Beckton, 2.30 p.m., preceded by lunch at the Town Hall, Barking.
17.—S.B.G.I.—Council Meeting, 56, Victoria Street, S.W. 1, 11.30 a.m.
18.—I.C.E.—Special Council Meeting, 2.30 p.m.
18.—NORTH OF ENGLAND ASSOCIATION (AUXILIARY).—Meeting at Middlesbrough.
18.—WAVERLEY ASSOCIATION.—Annual Meeting at Edinburgh.
19.—LONDON AND SOUTHERN JUNIORS.—Summer Visit to Luton.
23.—I.G.E.—Pipe Committee, 3 p.m.
24.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—County Meeting at Luton.

News in Brief

An Increase in Discount Rates of the Westgate and Birchington Gas Company was announced at the monthly meeting of the Standing Committee of the Westgate Chamber of Commerce.

As a Going Concern the Tralee U.D.C. invite offers for the purchase of the Gas Undertaking freed from all financial liabilities. Further particulars will be found in our advertisement columns this week.

Application for a Special Order under the Gas Undertakings Acts, 1920 to 1934, is intended to be made to the Board of Trade by the Darlington Corporation with the object *inter alia* of empowering the Gas Department to erect gas-works plant upon certain lands.

A Recommendation for the Extension of the carbonizing plant at Foleshill Gas-Works of the Coventry Gas Department, at a cost of £102,385, will we understand be submitted shortly to the City Council. The extensions will increase the productive capacity of the works by 2½ million cu.ft. per day.

Meters, Ltd. (comprising J. & J. Braddock, Oldham and London, George Orme & Co., Oldham, and Sawer & Purves, Manchester, Nottingham, and Watford), have announced that any employee of the Company in the Territorial Services attending the annual camp will be paid the difference between the normal pay and any military allowance received during the training.

The Price of Gas in Arbroath has been increased by 4d. per 1,000 cu.ft. It was agreed by the Gas Committee of the Town Council on May 26 that the price of gas for the current year be increased from 2s. 6d. to 2s. 10d. per 1,000 cu.ft. for ordinary consumers, and from 2s. 10d. to 3s. 2d. per 1,000 cu.ft. for prepayment consumers. The increase has been necessitated by the increase in coal prices.

A Record Increase of 153 million cu.ft. of gas made by Edinburgh Corporation was reported to the Public Utilities Committee on May 28 by Mr. James Jamieson, Engineer and Manager of the Gas Department. The amount made last year by the Corporation totalled 4,089 million cu.ft. For the past ten years the increased amount of gas made was more than 800 million cu.ft., equivalent to 25%.

Amalgamation and Grouping

United Kingdom and Radcliffe and Little Lever.

Terms have been agreed with the Radcliffe and Little Lever Joint Gas Board and the United Kingdom Gas Corporation for the transfer of the Board's Undertaking to the Corporation.

Councillor Walton, a member of the Company's Board, informed the Radcliffe Trades Council on May 25 that the Corporation had recently acquired the Farnworth Gas Undertaking. There was not room for extensions there; the Corporation were consequently handicapped in their desire to cheapen gas and they stated it was their intention to close a large section of the works at Farnworth and make gas at Radcliffe.

The Institution of Gas Engineers

Acknowledgment of Loyal Address

The Secretary of The Institution of Gas Engineers (Mr. J. R. W. Alexander) has received the following letter from the Home Secretary, Sir John Simon:

> "I have had the honour to lay before the King the loyal and dutiful Address from the principal Engineering Institutions and Societies of the United Kingdom of Great Britain and Northern Ireland on the occasion of Their Majesties' Coronation. I have been commanded by the King to convey to you Their Majesties' warm thanks for the assurances of loyalty and devotion to which the Address gives expression on behalf of The Institution of Gas Engineers."

CURRENT EVENTS IN THE GAS INDUSTRY

Newcastle Refrigeration Campaign

Sales Letter

A gaily coloured sales letter is at present being sent out to 10,000 of the consumers of the Newcastle-upon-Tyne and Gateshead Gas Company as part of their refrigeration campaign. The letter runs as follows:

DEAR MADAM,—

"Will they keep fresh until to-morrow?"—the unfinished joint . . . half-bottle of milk . . . salad left-over . . . remnants of sweets.

This is a problem which has to be faced over and over again in the home.

No doubt friends have told you what a blessing a Gas Refrigerator is . . . how it prevents food losses, simplifies food-buying, ensures food safety, makes lovely cooling dishes and the wonderful saving in not having to throw away a pennyworth of food, never to have tired-looking salads, running butter or suspicious milk . . . never a food difficulty, never a doubt!

A Gas Refrigerator is now no longer a luxury. You can own one for as little as 1s. 8d. per week . . . fixed free . . . maintained free and guaranteed for five years.

The running cost is extremely small . . . only a halfpenny per 24-hour day for gas at the cheap "Excess" rate, and the operation is simplicity itself.

Our representative will welcome the opportunity of calling to give you further help and advice.

The Institute of Physics

Annual General Meeting

The Annual General Meeting of the Institute of Physics was held on Wednesday, May 26. After election of the officers and completion of the panel of the Board, it was announced that the following would take office on Oct. 1, 1937:

President.—Mr. C. C. Paterson.
Vice-President.—Prof. W. Makower.
Hon. Treasurer.—Major C. E. S. Phillips.
Hon. Secretary.—Prof. J. A. Crowther.
New Members of the Board.—Prof. J. Chadwick and Mr. D. C. Gall.

The Annual Report for the year 1936, which was adopted at the meeting, shows that the membership has continued to increase in a very satisfactory way, especially as the standard required for Corporate membership is maintained at a high level. The total membership at the end of the year was 902.

An informal discussion on the training of industrial physicists was held on Feb. 11, 1936, at which appointed representatives of nearly every University and College in Great Britain and Ireland, of firms employing physicists and of Research Associations and Government establishments were present. As a direct result of this discussion a scheme was inaugurated whereby registered students of the Institute are enabled to gain first-hand experience of industrial research and development work in physics during their vacations. The report records that in its first year this scheme proved most successful.

During the year the various branches of the Institute both at home and overseas continued their activities, which are summarized in the report. The general improvement in industry is reflected by the report of a great increase in the activities of the appointments register and panel of consulting physicists maintained by the Institute.

1937 "JOURNAL" DIRECTORY

Page 8. BIRSTALL. R. Ellis, E. & M., retired.
Page 50. OKEHAMPTON. F. W. R. Santler appointed E., M., & S., vice H. S. Moore, resigned.
Page 62. SOHAM. A. Milner, M., deceased.
Page 80. BIGGAR. A. D. Coubrough appointed M.
Page 84. INVERBERVIE. A. D. Coubrough, M., resigned.

NEW SHOWROOMS FOR THE GAS LIGHT AND COKE COMPANY

A Ground-Floor View of the New Premises.

at

Feltham

Last week saw the official opening of yet another—the 61st—showroom for the Gas Light and Coke Company—this time at Feltham, Middlesex, a rapidly growing district with a population of more than 30,000.

It is quite certain that even the 61st showroom—which was opened on Tuesday of last week, in the High Street, Feltham, Middlesex—will be very far from the last of the series of these admirable "gestures," by which the Gas Light and Coke Company so successfully "court" their existing and potential consumers. Not too extensive to retain that feeling of homeliness which a mere man would imagine to be of prime importance in any endeavour to secure the confidence of the housewife, the showroom which has been provided for the convenience of Feltham is yet spacious enough to admit of the display in the most enticing manner possible of all the many things that are for that housewife's good. Just what these things are, readers have no need to be reminded here, and, tempted as they must find themselves, the inhabitants of Feltham will find out in due season. It is a splendid thing for the town, and it must be a good thing for the Industry as a whole, that an undertaking with such vast resources as the Gas Light and Coke Company possess, should come along and place unreservedly at the disposal of the inhabitants the very latest forms of appliances for increasing home comfort—and on the most generous of easy-payment terms, which permit of a number of the more expensive articles being regarded as the necessities which they really are, rather than as the inaccessible luxuries that, for a large proportion of the consumers, they would otherwise be.

The resources of the Gas Light and Coke Company to which reference has just been made include, of course, skilled co-operators and a staff possessing that best of all knowledge—the knowledge which is born of experience. Cooking, heating, and cooling—the last-named, most appropriately, for this time of year, in a leading rôle—are all featured attractively. So set out, one simply must look at what is displayed, and having looked once must look again. Even the writer, who long ago believed himself to be inured to such appeals, found himself gazing admiringly at gadgets which "yesterday knew not." There was a moment, indeed, when his hand went half-way to his pocket, but he remembered in time that those present had assembled to take part in the inauguration ceremony. There would be more suitable opportunities for business later on. These remarks should in no wise be regarded as flippant; they are, in reality, a plain unvarnished attempt to reproduce the spirit infused by a visit to a modern gas showroom such as the Gas Light and Coke Company know so well how to design and equip. No magic wand, but the eye and the hand of an artist have combined to banish by genial but refreshing schemes of decoration that dinginess, that hint of depression, which has been encountered in some gas showrooms of the past.

Feltham has been growing rapidly, until now it is a busy neighbourhood, with a population of over 30,000, which is the reason for the provision of this gas showroom in the main shopping thoroughfare, where, if viewed even from the standpoint of appearance alone, it is a decided acquisition to the neighbourhood. This must have been the opinion of all who stood watching while Mr. D. E. Knott, the Chairman of the Feltham Urban District Council, made use of the key giving entrance to the premises. When subsequently seen from the inside, both interest and admiration grew, and when tea was announced it was a highly appreciative, as well as a very large, gathering that sat down. There was applause when little Sheilah Gates presented Mrs. Knott with a magnificent bouquet. Mrs. Knott briefly, but feelingly, responded, which led Mr. R. W. Foot, the General Manager of the Company, who was in the chair (supported by Mr. Stephen Lacey, Controller of Gas Sales), to remark that she had thus made the occasion unique. Continuing, Mr. Foot said the reason why they were asking Mr. Knott to open these new showrooms was because the Gas Light and Coke Company was first and foremost a modern, up-to-date commercial concern. They realized that selling the gas and selling the apparatus was only part of what they had to do; this must be followed by efficient service. He then called upon Mr. Knott officially to declare the showroom open.

Mr. Knott said that, as a member of the community of Feltham, he warmly welcomed, on behalf of the whole of the inhabitants, the valuable facilities which were now being placed within their reach. There were countless small houses and flats, the occupants of which were, by force of circumstances, confined within the boundaries of their own locality, and these people would now have an opportunity of seeing all the most modern gas labour-saving appliances, and of ascertaining how much the installation of them would cost. Feltham was lighted by gas, and the Urban District Council were very anxious that this lighting should be improved, but at the same time without any considerable additional expenditure. Now that they had the Company actively with them in the district, he was certain that, by mutual co-operation, the question of more adequate lighting would be satisfactorily arranged. A well-lighted locality was an excellent advertisement, which they would greatly appreciate in Feltham. "We in Feltham," concluded Mr. Knott, "do welcome you here in our midst. I declare these showrooms open, and I take this opportunity of wishing everybody who has occasion to cross the theshold good health, good luck, and prosperity."

The Chairman of the Chamber of Commerce, Mr. Ames, added a few words expressing appreciation of the new showrooms, and Mr. Foot wound up the proceedings by declaring that the Company had every confidence that the showrooms were not only going to be profitable to the Company, but of very great service to the community of Feltham.

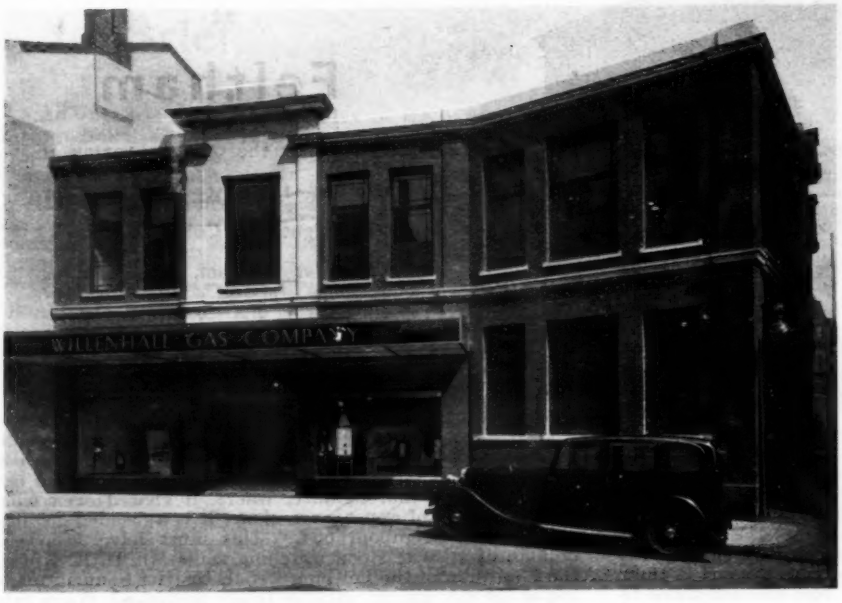
Glasgow and Coke Oven Gas

Recent Offers

We learn that Messrs. William Dixon, Ltd., Govan Iron Works, Glasgow, have offered to supply Glasgow Corporation with 6 million cu.ft. of unpurified coke oven gas daily at 5½d. per 1,000 cu.ft., the price being the same as that paid by the Sheffield gas grid.

Messrs. William Baird & Co., Gartsherrie Iron Works, Coatbridge, quoted 8½d. per 1,000 cu.ft. of purified gas, the 3d. difference being due to the cost of purification. The contract with Messrs. Nimmo which expired four months ago was at 11d. per 1,000 cu.ft. purified gas, Messrs. Nimmo offering renewal of the contract at 9d. per 1,000 cu.ft. Messrs. Baird's works are some miles from Glasgow city boundary, but Messrs. Dixon's works are half-way between the Tradeston and Dalmarnock Gas-Works of the Corporation, only one mile and a third of pipe-line being needed.

NEW SHOWROOMS OPENED TO CELEBRATE CENTENARY



Exterior View of the New Premises.

AT

Willenhall

A hundred years of progress were celebrated recently by the Willenhall Gas Company, who marked the occasion by opening on May 20 very fine new showroom premises in the Market Place, which were officially inaugurated by the Chairman of the Urban District Council.

At the first meeting of the Willenhall Gas Company, held at the Works on Feb. 17, 1837, it was resolved to purchase the Gas Undertaking for the sum of £4,911 4s. 10d. From whom, there is no record, but works were already in existence, and mains and services had been laid.

The Committee of the Company called the attention of their "friends and consumers to the conditions and regulations for the supply of gas, also the rates of charge; and they requested that the following conditions and regulations be attended to: "

Prices of Gas Lights.

	£	s.	d.	
Single jet factory light	0	0	6	per week
Double ,, ,, ...	0	0	9	,,
House and shop light, No. 1 Argand.	2	2	0	per annum
,, ,, ,, No. 2 Batswing	2	10	0	,,
Inn and public house lights . . .	3	3	0	,,

If by measure 10s. per 1,000 cu.ft. Large consumers or lights used for irregular periods subject to special agreement.

Apparently the credit of the Willenhall Lock Manufacturers in 1837 was not too good, as the charge for gas was to be collected weekly.

In June, 1838, the Grand Junction Railway Company agreed to take gas for their station at Wednesfield for a period of 21 years at 14s. per 1,000 cu.ft., being 4s. per thousand more than the general price by meter. As, however, it was necessary to lay a special main along the railway at a cost of over £750, the additional charge does not appear to be excessive.

The first seven years' history of the Company was a chequered one. The Company being kept short of funds owing to the delay of many of the shareholders in paying up their "calls," and consumers having to be sued for the amount of their accounts. But in 1844 under threat of a competitive undertaking, the Directors reduced the price of gas from a flat rate of 10s. per 1,000 cu.ft. to a scale varying from 9s. 2d. to 7s. 6d., and in the course of another seven years the scale became 6s. 8d. to 6s., subject to 5% discount. During the same period a dividend was paid commencing at 5% in 1844 and gradually increasing until it stood at 10% in 1851.

In the year 1891 it became obvious that it would be necessary considerably to increase the manufacturing capacity of the works, and in view of the small area available in Lower Lichfield Street and the fact that all coal had to be carted from the railway station, it was decided to purchase a piece of land in Short Heath, adjoining the railway. A Board of Trade order was obtained and entirely new works were put down to plans provided by the late Wm. North, of Stourbridge.

The works have been kept up to date, the latest additions being four West's semi-intermittent carbonizing chambers, having a daily capacity of 500,000 to 600,000 cu.ft. of gas. There are also eight beds of eight 20 ft. by 23 in. by 16½ in. horizontal retorts, and a Davison-Waller carburetted water gas plant of half-a-million cu.ft. daily capacity. Quite recently two additional purifiers have been installed by the Oxley Engineering Company.

After the plant at the old works had been dismantled the greater part of the site was sold, sufficient being retained to accommodate the Secretarial and Fittings Departments. New premises for these purposes being erected in 1898.

The New Showrooms.

With the necessity for increasing the activities of the Commercial side of the Undertaking, the Directors decided it was advisable to move the offices to a more central situation, and eventually the present site in the Market Place was purchased. This is now occupied by a fine block of buildings consisting of a large showroom, general and private offices, demonstration room, fittings' stores and workshop, providing sufficient accommodation for many years to come.

There are several features of interest in these buildings, for which Mr. J. P. Baker was Architect, in collaboration with Mr. W. G. S. Cranmer (the Engineer, Manager, and Secretary of the Company). The opaque canopy over the footpath in front of the showroom was adopted not only to give shelter, but also shade, with the object of darkening the showroom, so that the interior being at most times lit up by gas would show more effectively.

In addition to individual gas fires in most of the rooms, there is also a gas fired central heating installation on the "Richard" System, the licence to manufacture which has now been acquired by Messrs. John Harper & Co., Ltd., Albion Works, Willenhall. The whole of the connections to this installation are in small size copper tube supplied by the Yorkshire Copper Company, Leeds, together with their special fittings incorporating a solder ring.

The gas fire and other flues were made by the Vinculum Department of Tarmac, Ltd., of Ettingshall, near Wolverhampton. This method of flue construction for gas fires is very useful where it is necessary to save space, as the chimney breast can be omitted.

The following figures indicate the progress of the Company:

Year.	Make Cu.Ft.	Year.	Make Cu.Ft.
1886. . . .	36,575,000	1916. . . .	168,612,000
1891. . . .	43,682,000	1921. . . .	176,842,000
1896. . . .	66,306,000	1926. . . .	254,446,000
1901. . . .	97,513,000	1931. . . .	243,402,000
1906. . . .	114,673,000	1936. . . .	289,015,000
1911. . . .	136,850,000		

Willenhall, being an industrial town, offers considerable scope for the use of gas in many manufacturing operations, and the policy of the Directors has been to foster

Interior View of Showrooms.

the industrial load—which is now nearly 50% of the output—by a liberal sliding scale of charges, which also applies to gas used for domestic heating.

The Opening Ceremony.

A large company of visitors were present at the opening ceremony.

Councillor W. Johnson (Chairman of the U.D.C.), in declaring the offices and showrooms open, testified to the good feeling that had always existed between the Company and the local authorities. He hoped that the progress the Company had made in the past would be continued in the future.

Thanks to Councillor Johnson were accorded on the motion of Major F. Holcroft (a Director), seconded by Mr. C. J. C. Tildesley (another Director).

"The health, wealth and prosperity of Willenhall Gas Company" was proposed after luncheon by Councillor A. G. B. Owen, of Darlaston, who pointed out that the Company's output of gas had increased from 36,575,000 cu.ft. in 1886 to 289,015,000 in 1936, while he understood it was estimated that in the present year the figure would touch 300,000,000.

The Chairman of the Company (Mr. F. W. Pinson) acknowledged the toast.

A toast to Willenhall and its industries was proposed by the Mayor of Bilston (Alderman W. M. Hughes), who complimented Willenhall on its post-war progress in housing, street improvement, the provision of open spaces, &c. Mr. J. Legge, O.B.E., responded to the toast.

Responding to complimentary references by Mr. C. F. W. Rendle (Gas Engineer, Redditch), Mr. W. G. S. Cranmer pointed out that its progress proved clearly that gas was not a dying Industry. "We," he declared, "are 100 years young, and we hope to continue to progress. We have great competition from electricity, not because it is electricity, but because people can work wireless sets off it. We have had numerous cases of persons who would have been retained as gas consumers but for the fact that they wanted to put in all-mains wireless sets." Mr. Cranmer also appealed to architects and builders to provide, in the design of houses, kitchens large enough to accommodate modern cooking appliances.

Thanks to the Directors for their hospitality were heartily accorded on the motion of Mr. C. W. Parkes, seconded by Mr. R. J. Rogers, and the luncheon proceedings were followed by a visit to the Company's works at Short Heath.

Orders for Messrs. W. C. Holmes

Remodelling Stockholm Plant

Orders have been placed with Messrs. W. C. Holmes & Co., Ltd., 119, Victoria Street, S.W. 1, by the Municipal Gas Department of the City of Stockholm, Sweden, for "Holmes-Elex" electrical detarrers, and Holmes' Patent "Multifilm" washers for ammonia extraction.

The installation will consist of two detarrer units and two "Multifilm" washer units, each unit of a rated capacity 10·5 million cu.ft. of gas per 24 hr. at N.T.P. These plants form part of a scheme at present in hand for remodelling the wet purification and tar extraction system at the Gas Department's Works at Vartan.

Wandsworth Installation

The contract for an installation of purifiers of the Tower type has been placed with Messrs. W. C. Holmes & Co., Ltd., of Huddersfield and London, by Mr. C. M. Croft, M.Inst.C.E., Chief Engineer and General Manager of the Wandsworth and District Gas Company, for the Wandsworth Works of that Company.

Similar installations have been in operation in Germany since 1930, notably at the Works of Messrs. Thyssen at Hamborn, near Essen, but the plant for Wandsworth will be the first of this type to be erected for a British Company.

The plant will have a rated capacity of 10 million cu.ft. of gas per 24 hours, and will consist principally of six towers of riveted steel construction, each having twelve removable containers of oxide, the towers having connections for working in accordance with the backward rotation system, and for reversing the flow of gas through the oxide in each tower.

Meters, Ltd., Manchester

Annual Report

The report of the Directors of Meters, Ltd., Manchester, to be submitted at the Ordinary General Meeting at Blackfriars House, Manchester, on June 7, states that for the year ended March 31, 1937, the net profit amounts to £21,404, which, added to the balance of £8,209 brought forward, gives a total of £29,613. After deducting the interim dividends amounting to £6,562 paid in November last, the amount available for appropriation is £23,051.

The Directors recommend the following: The payment of final dividends for the year ended March 31 of 2¾% (actual) upon the Preference Stock, and of 6½% (actual) upon the Ordinary Stock, making the total dividends for the year 5½% upon the Preference Stock and 9% upon the Ordinary Stock (both less income-tax). That the balance of £10,598 be carried forward to next year's accounts.

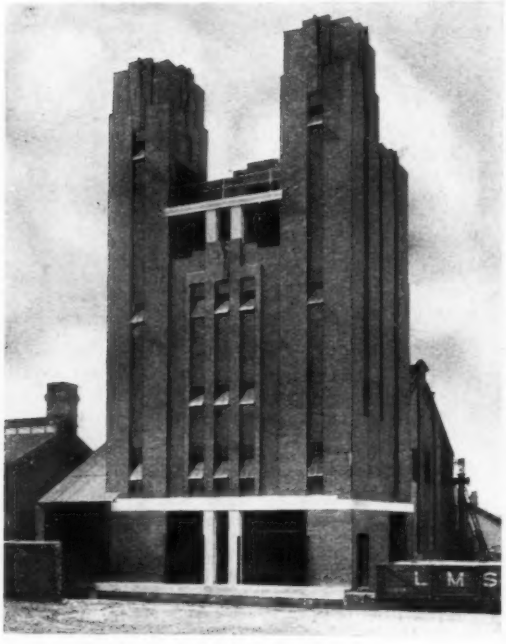
Mr. Thomas A. Braddock retired from the Board on March 31 after 25 years' service as a Director. Mr. William T. Glover, in consequence of ill-health, also retired from the Board on the same date after 6 years' service. Their colleagues desire to place on record their sincere appreciation of the valuable services rendered to the Company by both gentlemen since its inception. Mr. Joseph Morley has been appointed Chairman and Managing Director of the Company.

NEW "W-D" CONTINUOUS VERTICAL PLANT

AT

Prestatyn

Put into commission on May 14 last this new plant erected for the Prestatyn Gas Committee by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., consists, as will be seen from the photograph on the left, of a very pleasing building, which houses a bench of four upwardly-heated continuous vertical retorts capable of carbonizing 16·8 tons of coal and of producing 242,000 cu.ft. of 500 B.Th.U. gas per diem.



The Prestatyn Gas Committee have for the past few years been faced with the problem of either extending and reconstructing their existing plant or, alternatively, installing some new type of plant. The Gas Engineer, Mr. S. Trevor Roberts, submitted a report on the reconstruction of the carbonizing and other plant at the gas-works. After consideration of the report, the Council decided to obtain the services of Colonel W. M. Carr, Consulting Engineer, to report on the feasibility of the proposals, and his report fully endorsed the submissions advanced by the Gas Engineer.

The report was subsequently unanimously adopted and tenders were invited for the work.

The sanction of the Ministry of Health for the borrowing of the sum of £12,012 having been obtained, contracts for the necessary plant were placed as follows:

The Woodall-Duckham Vertical Retort and Oven Construction Co. (1920), Ltd.—An installation of continuous vertical retorts, of capacity 242,000 cu.ft. per day, complete with steam lift, waste heat boiler, water softening plant, &c.

Robert Dempster & Sons, Ltd.—12 in. Wecks centre valve, and alterations to purifiers.

Geo. Waller & Sons, Ltd.—One exhauster set; capacity 25,000 cu.ft. per hour.

W. C. Holmes & Co., Ltd.—One Holmes-Connersville type station meter; capacity 25,000 cu.ft. per hour.

After collaboration with the Council's Engineer as regards the elevation of the building and layout of the plant, work was actively commenced on the vertical retort plant on Aug. 17, 1936, and the plant was put into commission on May 14, 1937.

The New Installation.

The new installation consists of one bench containing four latest type upwardly-heated W-D continuous vertical retorts capable of carbonizing 16·8 tons of coal and of producing 242,000 cu.ft. of 500 B.Th.U. gas a day. The installation is provided with an induced-draught waste heat boiler. A steam-driven lift is provided for handling coal and coke to the various levels. The plant is housed in a steel-framed brick building, which, in view of the close proximity of the plant to the centre of the town, has been specially designed to present a pleasing and impressive appearance, as can be seen from our illustration.

The retorts are of the smallest type developed by the Woodall-Duckham Company. On small works, in order to obtain maximum flexibility of operation, the carbonizing plant should be divisible into a reasonable number of separately controllable units. Although the plant has a gas output of only 242,000 cu.ft. a day, there are four retorts in the bench with three air-cooled division walls dividing these retorts into four separate units, so that any one retort can be heated up, scurfed, or let down cold without interfering in any way with the working of the other retorts. In this way fluctuations in the demand for gas, which are apt to be particularly varied in a seaside resort, can be closely met.

The retorts are about 21 ft. high, rectangular in plan and tapered to allow continuous regular descent of the coal. They are 44 in. long and 10 in. wide at the top.

The Woodall-Duckham system of upward heating in vertical flues, which follows the natural flow of the hot combustion gases, is particularly simple to put into operation and to control. When the heats have once been regulated, only the producer gas and the waste gas dampers need adjustment.

By the introduction of the upwardly-heating principle the temperature in the vertical combustion flues is sufficiently reduced at the point where erosion of the silica normally takes place to allow the retorts at this level to be constructed with perfect safety in firebrick. By the time the coal has travelled past this belt of firebrick and enters the silica portion of the retort, it has acquired sufficient heat to avoid the extreme differences in temperature on either side of the retort wall, which are the main cause of the erosion of silica material at this point. In this way the full advantage of silica construction, as regards high throughput of coal, is obtained, with a reduction in maintenance costs.

Both the side walls and the top of the bench are efficiently insulated with the double object of improving the working conditions and saving fuel.

Coal Supply to the Retorts.

Small coal is delivered into a steel receiving hopper of 10 tons capacity arranged below ground level. The hopper is equipped at the top with a steel grid of 3½ in. mesh to prevent oversize coal being delivered to the retorts. By means of a hand-operated rack and pinion door, coal is discharged from this hopper into a skip in a subway beneath. From here the skip, which is of the side-discharging type, is run into a 25 cwt. steam-driven lift and is then elevated to the top level of an overhead coal storage hopper arranged above and along the retort bench. At this level the skip is run out of the lift and along an external platform between the two towers of the retort house, this platform being fitted with rails and turntables so that the skip can be run into the retort house and discharged into the overhead storage hopper. This hopper has a capacity equivalent to 24 hours' supply to the retorts and from it the coal is fed into the auxiliary hoppers attached to the top mouthpieces of the retorts.

To supply the gas for heating the retorts two producers are provided in a separate battery at the retort house floor level at one side of the bench. The battery is ar-

ranged so that one producer may be shut down without interfering in any way with the working of the other. The gas from either of the producers may be taken to any of the retorts. The producers are of the step-grate type and each is constructed with ample grate area for the efficient heating of three retorts. The step-grate eliminates the need for clinkering, the only attention required to keep the producer fire in proper condition being periodical pricking up at intervals of four hours or longer, depending on the class of fuel used. In order to give the producers maximum flexibility, both as regards producer gas output and as regards quality of fuel used, doors are provided on the fronts of the producers and arrangements made whereby primary air may be injected by steam into the producers in order to overcome the resistance of the fuel bed.

The tops of the producers are faced with good quality paving bricks laid on edge.

The waste heat boiler, which is of the Woodall-Duckham horizontal fire-tube return-flow induced-draught type, is designed for a working pressure of 100 lb. per sq.in. In order that the boiler may be worked up to maximum output, or to provide for periods when some of the retorts are not in operation, provision is made so that a supplementary supply of producer gas can be mixed with the waste gases before they are passed to the boiler.

A "Neckar" type water-softening plant is installed to treat the water before feeding to the boiler and is of capacity suitable to meet the full requirements both of the waste heat boiler and the existing Lancashire boiler.

The whole of the steam required for the retorts, producers, lift, liquor pumps, feed water pumps, and fan engine is supplied by the waste heat boiler and there is a considerable surplus available for other works purposes.

The improved conditions under which the retort house duties are carried out when using this system of continuous vertical retorts, as compared with the older system of horizontal retorts, are very striking. Not only does the new installation give flexibility of output and greatly improved results per ton of coal carbonized, together with uniform quality and composition of gas produced, but the absence of smoke and steam and arduous labour is thoroughly appreciated by the workmen, as well as by those who reside near the works.

As previously mentioned, the retort house is a steel-framed brick building, the steel work being totally enclosed on the external faces. Great care has been taken in the design of the retort house to ensure that it should present a pleasing appearance when seen from outside the works. To this end, the lift shaft and chimney have been completely enclosed in two brick towers, designed to form the flanking features of a symmetrical façade executed in the modern "vertical" style of architecture. This result has been achieved without departing from the functional character of the building.

A noticeable feature of the plant is the freedom of access to all parts of the bench with generous headroom under the settings, easy stairways, and broad gangways, all of which make for ease and comfort of working and efficient operation.

The magnificent view of Prestatyn and the surrounding district obtained from the "towers" of the new retort house.

Determination of Viscosity of Liquids in Absolute Units

The B.S. method for the Determination of Viscosity of Liquids in Absolute (C.G.S.) Units, has just been revised. The first edition of the Standard appeared in 1923, and the revision has been carried out in the light of criticism and suggestions that have since been received. Opportunity has also been taken to introduce appendices containing data likely to be of service to users.

The measurement of viscosity is essential for many technical purposes, and the instruments generally used are far from satisfactory in many respects. This British Standard gives particulars of simple and accurate methods. The relatively inexpensive apparatus involved is readily procurable, easily calibrated, and free from the disadvantages attaching to the more costly viscometer at present employed. The apparatus has been specially designed in the hope that it will eventually replace such viscometers for commercial purposes. In earlier editions of this Specification the term "viscosity" was used to connote "dynamic viscosity," as is the case in most of the physico-chemical literature. Since the tube viscometers specified in Clause 5 (A) and all Ostwald viscometers, such as those specified in Clause 5 (B) (*a*), as well as the commercial oil viscometers, give indications of the kinematic viscosity rather than dynamic viscosity, it has become desirable that the results of viscosity determinations be normally expressed in terms of kinematic viscosity. If the density at the temperature of test is known, it should be recorded in order that it may be possible to calculate the dynamic viscosity. This procedure agrees with a resolution carried at the World Petroleum Congress in London in 1933.

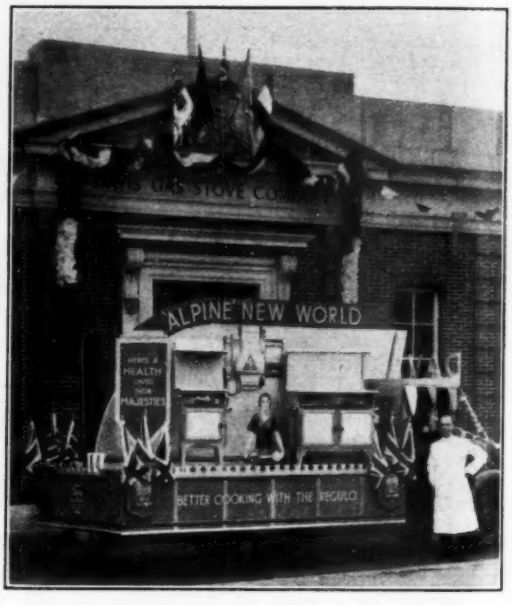
There are many liquids and semi-liquids of industrial importance for which the simple laws of viscous flow do not hold. Emulsions, suspensions, and colloidal solutions, particularly such as are capable of "setting" at temperatures not far below the temperature of test, may have apparent viscosities that depend not only on the thermal and mechanical history of the sample, but also on the characteristics of the particular viscometer in which observations are made. It is obvious that the resistance to flow of these materials cannot be completely expressed by the result of any single determination. In spite of this limitation the behaviour in a given viscometer is frequently used as a criterion for certain systems that exhibit or are liable to exhibit the above anomalies. For systems of this kind the instruments here described are usually at least as suitable as the commercial efflux viscometers, since they allow better control of temperature and reduce the extent of exposure to the atmosphere, while their dimensions are specified closely enough to define the rates of shear: the nature of the results obtained by multiplying times of flow by the calibration constant of the viscometer should be recognized by stating them as "Apparent viscosities determined in (a specified) viscometer."

Copies of this British Standard (No. 188-1937) may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, S.W. 1, price 2s. 2d. post free.

On the left is a "close-up" of the gas sign at the Vauxhall Works of the South Metropolitan Gas Company.

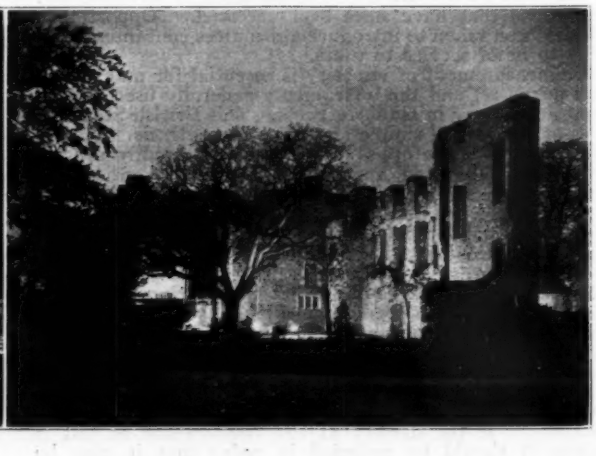
More News and Views of the Industry's Part in the Coronation Festivities

Some effective floodlighting was carried out by the Croydon Gas Company for the Coronation. The above photograph, which was taken by Mr. P. Richbell, the Company's Mains Superintendent, shows the excellent results of the installation at Carshalton Place.

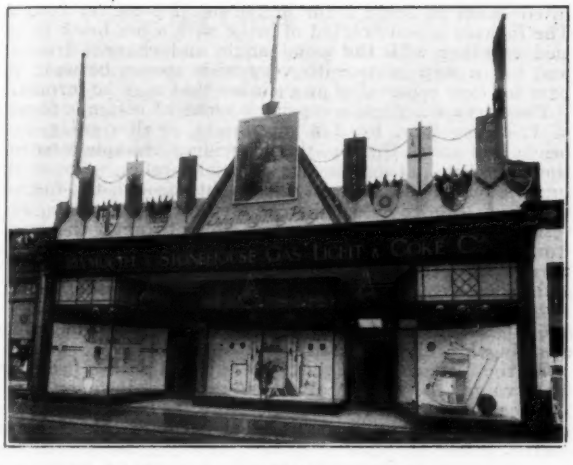


The above striking display was arranged by the Davis Gas Stove Company (Radiation, Ltd., proprietors), of Luton, and created a great deal of public interest in the Coronation celebrations in that town.

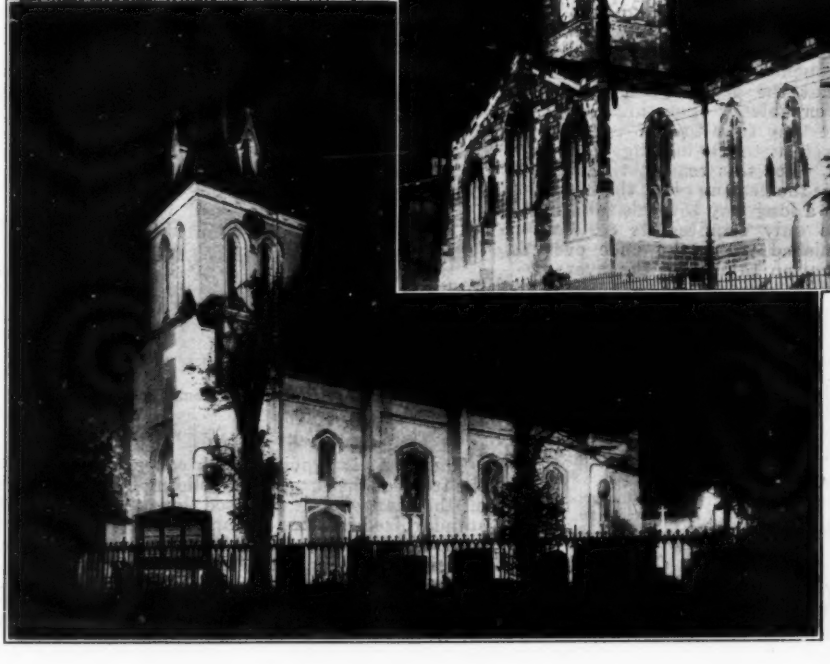
The Leicester Gas Department used Calor gas for floodlighting, with splendid results, as the two photographs at the bottom of this page show. That on the left is a view of the Castle Gardens, while on the right is a lovely glimpse of a corner of Leicester Abbey.



On the left is a photograph of the Office frontage of the Parkinson Stove Company, Ltd., attractively decorated for the Coronation and floodlighted by Parkinson's "Flood-Lite" gas lamps.



Above (left) shows the special display arranged for the Coronation at the Showroom of the Plymouth and Stonehouse Gas Light and Coke Company. Above (right) is a holder at the Dundee Gas-Works with a floodlighted display 30 ft. long by 20 ft. high, illuminated by six Sugg's parabolic floodlamps and two Foster & Pullen's "Avil" strip lanterns.

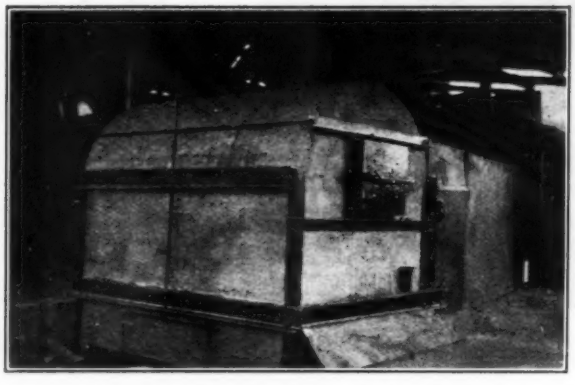


Two beautiful examples of church floodlighting by gas—left, St. Leonards, Streatham, carried out by the South Metropolitan Gas Company; and, above, th Parish Church, Huddersfield, carried out by the local Gas Department.

FURTHER DEVELOPMENTS IN

Grass-Drying Plant

Through the courtesy of the London and Counties Coke Association we are able to give a description and some recent test figures relative to a Curtis grass-drying plant equipped with a semi-producer furnace designed by the Association, which has lately been put to work on a farm at Chessington, in Surrey.



A View of the Furnace showing Hopper Charging Door; the Fan can be seen in the right background.

The timely advent of spring and the beginning of new growth in the field marks another step forward in the artificial drying of grass. This should be of particular interest to producers of coke, due to its suitability for drying and potential large sales of coke for this purpose, as the usual size of grass dryer uses 150 to 200 tons between April and September.

There is no need to recapitulate here the principles or the advantages of a process which was fully described in the columns of the "JOURNAL" for Sept. 2 last and mentioned again as recently as Jan. 27. With a process still relatively in its infancy, however, there is no standing still; and even in the few months which have elapsed since our earlier references to the subject new facts and figures have been brought to light as a result of the continued efforts of technical investigators.

Among the most active of such investigators are the London and Counties Coke Association, who have been exceptionally painstaking in their endeavours to develop the grass-drying process as a useful outlet for the Gas Industry's primary by-product. And it is gratifying to be able to say that their work has led to the development of a very satisfactory coke-fired furnace which is particularly suitable for grass-drying plant. Through the courtesy of the Association we were enabled to inspect recently one of the latest installations—a dryer in operation at Mr. Sydney Moon's farm at Chessington, in Surrey.

This is a Curtis plant to which has been fitted an L.C.C.A. design of automatic semi-producer furnace.

In addition to efficiency, an essential feature of such plants is, of course, low operating costs; and the trouble-free nature of a coke furnace working on the gravity-feed principle immediately recommends it for the work. It has to be borne in mind that the general run of farm labourers are not engineers capable of operating complicated heating units; nor have they time to give continual attention to the furnace as well as to the loading, unloading, and baling of the grass. For this reason, therefore, the more completely automatic the heating plant the better. The Chessington furnace goes a long way towards fulfilling this object, for the furnace only requires its 8-9 cwt. storage hopper to be replenished with coke once every three to four hours—an operation taking on the average about six minutes.

A coke furnace of this nature would normally cost from £75 to £80 to install, plus a further £15 or so for the construction of the concrete pit in which it is built. In this particular case, however, it is interesting to note that, having been given the drawings of the furnace, the farm hands erected the unit with the assistance of a local bricklayer for about £50, it being necessary to purchase specially merely one or two of the iron fittings, such as the hopper door, &c.

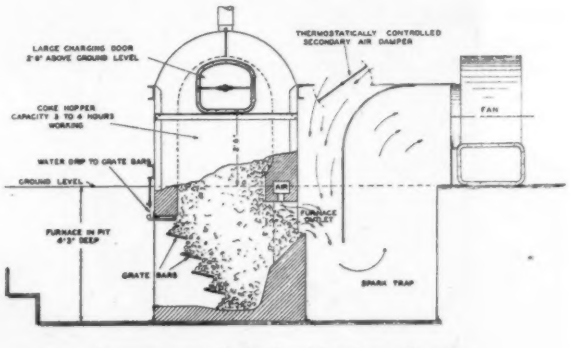
Construction of Furnace.

The furnace is similar in many respects to a producer furnace, but the effective firebed is only 2 ft. 6 in. thick and is always flaming at the outlet, so that there is no possibility of inflammable gases leaving the outlet unignited—such as could occur in the usual producer furnace. The furnace is constructed of brick with a fire-brick lining, tied together with the usual angle and channel framing, and has a step grate with very wide spaces between the bars for easy removal of any clinker that may be formed.

The furnace outlets comprise a series of columns formed of 12-in. by 9-in. by 3-in. fire-bricks, with similar sized bricks laid across the top, thus providing a simple construction and eliminating the use of brick arches. Above the furnace outlets an air duct runs right through the furnace wall from side to side for secondary air supply, this, as a result, being slightly pre-heated; holes through the brickwork provide for a flow of secondary air to each of the narrow furnace outlets. The top of the furnace is arched, and a large charging door is provided in the side; the pit is 4 ft. 3 in. deep, while the charging door is 2 ft. 3 in. above ground level, which is a most convenient height for charging quickly and easily.

On the furnace top a vent pipe is fitted with a "butterfly" valve, the handle of which projects down over the furnace door; the valve has, therefore, to be opened before the furnace door can be opened, thereby allowing the escape, before the door is opened, of any gases which may have collected in the top of the coke hopper. A water drip at the rate of 12-14 gallons per hour is carried to the grate bars to promote a water gas reaction in the fuel bed. The furnace is rated to burn 2½ cwt. of coke per hour.

The temperature of the gases at the outlet of the furnace is about 1,000° F., which is reduced by the admission of suitable quantities of fresh air to a temperature of 280°-300° for the drying process. The diluted gases are drawn by means of an electric fan through a spark trap, and a drier designed to produce from 3 to 5 cwt. of dried grass per hour (according, of course, to moisture content) requires a delivery of approximately 20,000 cu.ft. of gases per minute at this temperature through the product.



Arrangement of the Semi-Producer Furnace.

The plant is provided with cover plates for shutting off the front of the furnace and sliding brick doors for shutting off the rear when it is closed down. Such units have been standardized in sizes to burn from 1½ to 3 cwt. of coke per hour, though they can, of course, be made in very much larger sizes if required. It is understood that a furnace designed to burn 3 cwt. of coke per hour can be built at a cost of well under £100.

Further points in connection with this plant which are

worthy of note are that full temperature can be obtained and drying commenced within 50 to 60 minutes of lighting up, while the heat output is so steady that it is hardly considered necessary to fit thermostatic control.

In the case of batch drying of grass, where part of the air is re-circulated, the furnace is very responsive to a quick pick-up in temperature at the beginning of each cycle. When stopping for short periods—such as the dinner-hour—the front and rear doors are closed and the fan is stopped. The plant can commence drying again immediately the fan is re-started.

When banking up for the night the furnace doors are closed, and the coke in the hopper above is damped with a spray of water from a perforated pipe running through the top of the furnace. The fuel consumption during a 12-hour banking period is approximately equivalent to one hour's rated consumption—*i.e.*, a furnace rated at 2 cwt. per hour will consume about 2 cwt. during the 12-hour banking period. After being banked up for the night full temperature can be attained and drying commenced within five minutes. The furnace will run for 16 hours without clinkering, while its design is such that only a small amount of clinker is formed, and this is easily removed by pulling through the wide spaces between the grate bars; clinkering occupies only five to seven minutes.

The Drying Section.

The drying section of the plant consists of four trays, the two outside trays taking the newly-cut grass for preliminary drying, while the two inner trays are covered compartments in which the drying process is completed. A hand-controlled valve diverts the hot gases either to the two left-hand trays or to the two right-hand trays, the covered section being moved to enclose either one or other of the centre sections according to which side is actually drying the grass. The hot products passing up through the grass in the outside trays is blown to atmosphere, while those passing through the grass in the enclosed tray is drawn back and re-circulated through the fan.

The cycle of operation is as follows. After 15 to 20 minutes (according to the moisture of the product) of preliminary drying in the left-hand outer tray, the grass is forked into the left-hand inner tray and the cover rolled into position above the latter. In the meantime a fresh load of grass is placed in the outside tray. On completion of drying in the left-hand inner tray, the cover is rolled across to the right-hand inner tray into which another partially dried load has previously been forked from the right-hand outer tray in which it has been partially dried, and at the same time the valve is switched over to divert the hot gases through the two right-hand sections. The inner left-hand tray is then emptied of the completely dried grass and filled again with the partially dried product from the left-hand outer tray—and so on.

It will be appreciated that as soon as the hot gases are diverted to the new section there will be a considerable drop in temperature as a result of the large amount of moisture through which they have to pass. In order to counter-balance this drop in the temperature of the re-circulated gases, therefore, the air inlet damper on the furnace is partially closed for a few minutes by the raising of a weight at the extremity of a wire which is carried to the point at which the operator turns the wheel which rolls the cover from one inner tray to the other. The presence of this weight right in front of him serves as a reminder to close the damper at each change-over. The damper is subsequently opened again as the drying process progresses.

The completely dried grass is forked out on to a platform and passed to the baling machine, which produces about two bales per tray load, varying in weight from 70 to 90 lb.

Efficiency Tests.

Recent tests carried out on the Chessington plant, using large coke supplied by the Wandsworth and District Gas Company, show the following results:

Grass dried	Rye grass and clover, well grown but leafy.
Duration of test	15·33 hr.
Water ratio of grass	4·45 to 1
Dried grass produced	46·1 cwt. (3 cwt. per hr.)
Water evaporated.	205·1 ,, (13·35 ,, ,,)
Coke used	28·6 ,, (1·86 ,, ,,)
Water evaporated per lb. of coke	7·18 lb.
Drying temperature	285° F.
Resistance through firebed	0·17–0·24 in. of water
Average drying period	21 minutes
Calorific value of coke	12,270 B.Th.U.
Ash content of coke	8·8%
Moisture content of coke	6·0 ,,

The above tests were carried out by the London and Counties Coke Association in conjunction with Mr. J. S. Watkins and Mr. G. H. Swinburne (of the Grass Drying Department of Imperial Chemical Industries, Ltd.), and Dr. F. J. Eaton (of the Gas Light and Coke Company). It is considered that the efficiency represented by an evaporation of 7·18 lb. of water per lb. of coke is high for a plant of this size, and particularly good when drying early spring grass, which is generally recognized as being most difficult to deal with.

The growing interest which is being taken in grass drying is encouraging, as evidenced by a Paper recently read by Mr. J. E. Newman before the Society of Engineers, in London, in the course of the discussion on which Mr. A. C. Hutt, of the L.C.C.A., and also Dr. Eaton quoted some of the facts and test figures relative to the Chessington plant. The Paper itself dealt with grass-drying from an engineering standpoint and showed how the physical properties of the grass being treated had an influence on the method employed; the advantages of re-heating and re-circulation were pointed out, while the subsequent discussion touched upon the possibilities of further improvement, as well as the national importance of a process which may eventually make this country independent of imported cattle foods.

There is every reason to hope that any such developments will be of material assistance not only to the agricultural industry, but also to the Gas Industry, whose major by-product has been proved to be one of the cheapest and most trouble-free fuels available for the purpose. It is hardly necessary to repeat that gas undertakings—no matter where they are situated—which are not exploring the potentialities of this field in their own areas are losing valuable opportunities of augmenting their coke load.

A very complete brochure on "Grass Drying" has been issued by the London and Counties Coke Association from whom copies are obtainable.

Government Support for Grass-Drying Research.

According to a statement made last Thursday by the Minister for Agriculture further research on the subject of grass-drying will receive encouragement from the Government. This is a welcome step, for notwithstanding the great strides which have recently been made, it seems at the moment inevitable that several years must elapse before the general run of farmers, unless operating on a fairly considerable scale, will be able to afford the initial cost of a drier. Capital costs will have to come down and the output increased.

There is every indication, however, that a very much wider interest is being taken in grass-drying at the present time. The knowledge of scientists, engineers, and practical agriculturists is being pooled to speed up this important development, which may do much to reduce the farmers' expenditure on winter foodstuffs for his livestock. Two years ago there were less than a dozen driers at work in this country; to-day there are at least 50, some of them being on a very large scale.

Last Monday there also appeared a report which has been prepared by Mr. E. J. Roberts, of University College, Bangor, at the request of the Agricultural Research Council. This report points out that twelve years ago scientists at the Cambridge School of Agriculture confirmed that young grass cut at frequent intervals and dried artificially had protein content as high as 28% greater than that of many imported cattle foods; digestibility of more than 80% with a very low proportion of fibre; and splendid capacity for retaining carotene—the parent substance of Vitamin A—which keeps the creamy colour in milk and butter. Statistics showed that last year the cost of producing a ton of dried grass varied from £4 to £7, with a general average of £6—a figure which compares favourably with imported concentrates of the same feeding value.

A Book on the Subject.

A book entitled "Grass Drying," by S. W. Cheveley (Ivor Nicholson & Watson, 6s.), has also just made its appearance at an opportune time. The first part deals with the necessity for grass drying, while its effect upon employment is also stressed. Ten thousand driers, it is suggested, would require one and a quarter million tons of coke each year, while the machines themselves would give employment from April until October to some 30,000 men. A plea is also made for Government support and financial backing to assist in designing a simple drier for the small farm, to arrange for manufacture of such driers in large quantities at the lowest cost, and to extend credit to farmers for the purchase of driers over a period of years with interest at a low rate.

In This Week's "JOURNAL" - - -

Coke Quality and Domestic Sales.

"The Domestic Coke Load" was the subject of a short Paper by Mr. C. J. Dougherty at a meeting of the Yorkshire Junior Gas Association on May 22. The Author points to the advantages of dry cooling of coke, and emphasizes the importance of grading and of supplying the customer with the correct grade for his particular purpose.

See p. 638.

Grass-Drying Developments.

A semi-producer furnace for grass-drying plant has been developed by the London and Counties Coke Association, and some interesting facts and test figures relative to such a furnace in conjunction with a Curtis grass-drier recently put to work on a farm at Chessington, Surrey. Further particulars of the grass-drying process generally is evidence of the greater interest which is now being taken in the subject, which will be of considerable value to coke producers who are in search of new outlets for their fuel. It is also of interest to note the recent statement by the Minister for Agriculture that the Government will give every encouragement to further research. A book has also just been published on the subject, while a complete brochure is obtainable from the L.C.C.A.

See p. 616.

Wales and Monmouthshire Association.

Mr. H. D. Madden (Engineer and Manager of the Cardiff Gas Light and Coke Company), President for the third time of the Wales and Monmouthshire Association of Gas Engineers and Managers, delivered his Presidential Address at the Annual Meeting held at Cardiff on May 27. Examination of the events which have led up to the present position of the Industry was the theme of his remarks.

See p. 624.

Eastern Counties Association.

The Half-Yearly Meeting of the Eastern Counties Gas Engineers' and Managers' Association was held at Aldeburgh on May 21; and in his Presidential Address Mr. C. R. Fowler, of Leiston, gave an interesting sketch of the history of the Leiston and Aldeburgh gas undertakings, and developments which have been carried out, particularly during the last ten years—or, roughly speaking, during the time that the undertakings have been controlled by the British Gas Light Company.

See p. 632.

Preheating in Dry Purification.

Of all the various processes operated at a gasworks, that of dry purification of the gas for the removal of sulphuretted hydrogen is too apt to suffer from lack of technical control. To what extent technical control can influence working results of the process is brought out in an excellent short Paper at a meeting of the Yorkshire Junior Gas Association by Mr. J. Castle, of the Brighouse Gas Department. The Author points out that, with a knowledge of the sulphuretted hydrogen removed and the temperature of the outgoing gas, it is only necessary to vary the temperature and saturation of the incoming gas in order to maintain the correct moisture content of the oxide. He describes a system of temperature and humidity control consisting of a separate preheater for each box. The system is manufactured by W. C. Holmes & Co., Ltd. Preheating, it is shown, resolves itself into an effective method of controlling moisture conditions within the purifiers by controlling the humidity of the gas.

See p. 636.

Gas Undertakings' Results

Accrington.

The Engineer and Manager of the Accrington and District Gas Board, Mr. A. J. Harrison, reports that there had been a record output during the year, consumption being 31 million cu.ft. in excess of 1935-36. Gross profit is £33,516, and after meeting standing charges and tax, there is a net profit of £1,147, which brought the Board's reserves to £17,706. Explaining the comparatively small net profit, Mr. Harrison said £6,031 was paid in tax, £14,243 interest on debentures, stock, annuities, and mortgages, and £11,832 was contributed to sinking fund. There was capital expenditure which would be met out of revenue.

Belfast.

A gross profit amounting to £128,470 is shown in the annual report of the Belfast Gas Department submitted by Mr. J. D. Smith, Engineer, Manager, and Secretary. This represents a decrease of £15,042; the coal bill for the year, however, was £23,000 higher. The total gas made amounted to over 4,594 million cu.ft., an increase of 128,000 cu.ft. About 3,586 million cu.ft. were coal gas and 1,008 million cu.ft. water gas. The quantity of gas sold was over 4,516 million cu.ft., 36% of which total was sold through prepayment meters, an increase of 44 million cu.ft., while unaccounted-for gas showed the very low figure of 1·698%. In revenue account, the gas sold through prepayment meters showed an increase of no less than £12,437, while there was an increase of £1,340 in gas sold through ordinary meters. There was an increase in revenue from the sale of coke of £4,667. Consumption of coal showed an increase of over 5,000 tons. The average price of current contracts represented an increase over last year of 2s. 2d. per ton. It was found necessary to increase the price of gas by 2d. net per 1,000 cu.ft. as from Oct. 1, 1936. New mains were laid to the extent of about 22 miles, at a capital cost of £22,015. The total number of meters in use showed an increase of 3,625 over the previous year, wholly accounted for by prepayment meters. The total now stood at 120,218, of which 52,340 were ordinary meters, and 67,878 auto meters. Gas for public lighting continued to hold its own, and during the year they supplied 400 million cu.ft.

Blackburn.

The annual report of the Blackburn Corporation Gas Engineer and Manager (Mr. J. D. Ashworth) shows the total quantity of gas made was 1,064 million cu.ft. Consumption had been in the following proportion: Ordinary meters 34·53%, prepayment meters 41·11%, industrial meters 7·83%, public lighting 7·66%, gas-works 1·25%, and unaccounted-for 7·62%. Total wages for the year amounted to £45,491, against £44,214, an increase of £1,276, equal to 11·26d. per 1,000 cu.ft. of gas sold. Rates of pay had generally increased in accordance with settlements negotiated by various industrial councils and further advances might be expected. The value of appliance sales through the showrooms amounted to £27,140, an average of £540 per week, against £473 per week the previous year. The results achieved were very gratifying when modern competition was considered. The balance outstanding on hire purchase agreements was £54,871, represented by 15,268 creditors, an average amount of £3 11s. 10d., against £3 2s. 9d. last year. Building sites had necessitated an extension of mains by 6,431 yds., against 5,123 yds. the previous year, and new services numbered 618, against 482. Coal carbonized amounted to 44,210 tons, against 48,066 tons, a decrease of 3,856 tons. Coke sales had continued active, with local demand almost exceeding supply. Expenditure on revenue account was £121,150, against £119,452, an increase of £1,698, while income amounted to £180,311, against £183,062, or £2,751 less than the previous year, with a gross profit of £59,161, against £63,610, a decrease of £4,449. After payment of sinking fund and interest charges, amounting to £55,356, with income-tax of £8,800, there remained a net profit of £1,059, which, with £422 brought forward, left a balance of £1,481 in reserve.

Carlisle.

For the year ended March 31, 1937, the Carlisle Corporation Gas Department shows a gross profit of £31,272. After providing for income-tax, loans repayment, &c., there is a net profit of £4,038. For the year ended March 31, 1936, there was a gross profit of £32,316, and a net profit of £5,204.

Darlington.

A satisfactory report regarding the Darlington Gas Department has been submitted by Mr. A. E. Ruffhead, Engineer and Manager. The consumption of gas has reached a higher level than ever before, and during the past year a record in sales of gas appliances was established. During the year ended March 31 last the amount of gas sold was over 649 million cu.ft., an increase over the previous year of over 15 million cu.ft. The number of cookers, fires, water heaters, wash boilers, and the like, sold during the year ended March last considerably exceeds that of any preceding year.

St. Helens.

At the last meeting of the Gas and Lighting Committee of the St. Helens Corporation it was reported that during the year ended March 31, 1937, the quantity of gas produced by the Corporation Gas Undertaking was 1,126,690,700 cu.ft., being an increase of 30,661,000 cu.ft., or 2·79% over the previous year. The gross profit was £36,020. Capital charges and income-tax amounted to £20,818, leaving a net profit of £15,202. The cost of gas into the holder was 12·01d. per 1,000 cu.ft., or 2·53d. per therm, and the average net price received for gas was 28·99d. per 1,000 cu.ft., or 6·10d. per therm.

The Wales Association and a Cardiff Centenary

The happy spirit which invariably pervades the meetings of the Wales and Monmouthshire Association of Gas Engineers and Managers was, if possible, accentuated on the occasion of the thirty-second annual gathering, which was held on May 27, in the Lecture Theatre of the South Wales Institute of Engineers, Cardiff.

One of the most highly respected and popular members occupied the Chair—for the third time in the Association's history—and for the particular reason that this is the hundredth year of his Company's existence. To no person (with the exception of Mr. Octavius Thomas), and to no Company, could the Wales Association owe as much as they do to their President, Mr. H. D. Madden, and to the Cardiff Gas Light and Coke Company, and last week's proceedings both honoured this debt and added to it.

There was a large attendance, and those present included a number of representative guests and friends who had travelled far to honour a valued personal friend and to enjoy the hospitality of the leading Gas Company of Wales. Those specially referred to by the President at the opening of the proceedings included Mr. Stephen Lacey, President of The Institution of Gas Engineers; Mr. Robert Robertson, of Bristol, Junior Vice-President; and Mr. John Terrace, Hon. Secretary, and a former Institution President; Mr. W. J. Smith, Secretary of the National Gas Council; Mr. A. W. Smith, of Birmingham, Executive Chairman of the British Commercial Gas Association, and Mr. P. J. Lucas, Secretary; Mr. E. L. Nicholas, of Guildford, represented the Southern Association, and Col. Planck the Society of British Gas Industries. Greetings were also extended to Mr. J. Wesley Whimster, of Bath; Mr. H. Gage, late of Sutton, and now of the Wandsworth Company; and Mr. R. G. Shadbolt, of Birmingham. A Marconigram had been received from Mr. Halliwell, of Bristol, who was at sea: "Best wishes centenary celebrations, and continued success. Regret distance prevents attendance."

The PRESIDENT, having extended his cordial welcome, went on to say that, immediately on receipt of the announcement that Sir David Milne-Watson had been honoured with a Baronetcy, he had sent him a telegram: "Heartiest congratulations from members of the Wales and Monmouthshire Association of Gas Engineers and Managers. Madden, President." To this Sir David replied: "Dear Mr. Madden,—Many thanks for the kind congratulations from yourself and members of the Wales and Monmouthshire Association on the honour I have received, which are much appreciated." Sir David would have been with them that day to congratulate the Directors of the Cardiff Gas Company on their centenary, had it not been for the fact that he had several Board meetings to attend.

Mr. OCTAVIUS THOMAS (the Hon. Secretary) then read the minutes of the last meeting, and they were confirmed.

On the proposition of Mr. I. G. JENKINS (Cardiff), seconded by Mr. A. E. PASK (Caldicot), the following additions were made to the roll of the Association:

Members.

W. R. Branson, M.Sc., Assoc.M.Inst.C.E., Assistant Engineer, Cardiff Gas Company.
Elwyn Jones, Gas and Water Engineer, Rhondda.
H. J. Wright, Gas Manager, Llandilo.

Student.

A. S. Bell, Articled Pupil to Mr. Madden.

Associates.

C. T. Anderson, Lighting Trades, London.
A. L. Morris, Controller of Purchases, Severn Valley Gas Corporation, Cheltenham.
E. J. Panter, Sidney Flavel & Co., Ltd., Leamington.

The report and accounts of the Council for the past year showed that at the close of the period there were 87 members, 4 honorary members, and 59 associates. The receipts for the year amounted to £151 18s. 4d., and the payments to £134 0s. 5d., leaving, with the balance brought forward, the sum of £63 17s. 4d. in the hands of the Treasurer, and £100 of 2½% Consols.

The report and accounts were adopted, on the motion of Mr. J. STEPHENSON (Aberdare), seconded by Mr. F. DUPONT (Brecon).

New Office-Bearers.

The following were elected to hold office during the ensuing year:

President.—J. Stephenson (Aberdare).
Vice-President.—H. G. Horwood (Bridgend).
Members of Council.—A. E. Pask (Caldicot) and C. B. Felton (Newport).
Hon. Treasurer.—J. H. Canning, O.B.E. (Newport).
Hon. Secretary.—Octavius Thomas (Cymmer, Porth).
Hon. Auditors.—D. Muir (Pontypridd) and J. H. Jones (Dowlais).

The PRESIDENT said it afforded him particular pleasure to propose Mr. Stephenson as President, because it was his due to be President this year. In view, however, of the centenary of the Cardiff Gas Company, Mr. Stephenson, acting on the suggestion of Mr. Octavius Thomas, stood down so that he (Mr. Madden) could accept the honour of being President in the centenary years of his Company.

Mr. J. E. KENSHOLE (Merthyr) remarked that he had been in close touch with Mr. Stephenson for many years, and he was quite sure they could not do better than have him as their President. He was delighted to second the proposition. [Applause.]

The PRESIDENT, proposing the re-election of Mr. Octavius Thomas as Hon. Secretary, said he had in his hand the first list of members of the Association, dated 1905. Mr. Thomas was Secretary then, and he had been Secretary ever since. He did not know what the Association would have done without him.

Mr. OCTAVIUS THOMAS proposed that they should subscribe ten guineas to the Benevolent Fund of The Institution of Gas Engineers. The Fund, he said, needed more money, and he hoped that a greater number of members would support it individually.

Mr. CANNING said he would like to support strongly this appeal on behalf of the Benevolent Fund. There were more demands upon it than could possibly be met at present, and it was up to all of them to do what they could to assist the good work.

The proposition was agreed to.

Presidential Address.

Mr. MADDEN then delivered his Presidential Address, which is reproduced on another page of this issue. At its conclusion,

Mr. ROBERT ROBERTSON (Bristol) said he counted it a great honour to have the privilege of proposing a hearty vote of thanks to the President. He pointed out that he had been a member of the Association for many years, although the President had been kind enough to refer to him as a visitor. This was a unique occasion, because it was the third time Mr. Madden had been President. Most Presidents were content to serve once, and were very glad if they survived their single year with any shred of reputation left. Mr. Madden's three years of office were indicative of his outstanding zeal and ability and of the high regard in which he was held by his colleagues in Wales. In this centennial year of the Company with which Mr. Madden was connected, the Association wanted an Address that would be fully worthy of the occasion, and they had not been disappointed. Mr. Madden had emphasized problems with which the Industry was faced to-day, and no one could have done it better, for he had long been a leader of the Industry in many directions—education, research, publicity, service, &c. He had shown them that he not only preached, but that he practised what he preached. The President had attained for himself and

for his Company a reputation throughout the country for high ideals, and both he and his Company were always prepared to place at the disposal of the Industry anything which could be of service. Indeed, Mr. Madden had done more than his share of hard work for the Industry, and his coming into harness again, as he had done, did show what an asset, not only Wales, but the Industry generally, had in Mr. Madden.

Mr. J. Wesley Whimster (Bath) said it was a great pleasure to second the vote—more especially as his friend, Mr. Robertson, from Bristol, had proposed it, because he knew that all he would have to do would be to corroborate what Mr. Robertson told them. The visitors were delighted to be present, and thanked the Association very much for their warm welcome. They had listened with the utmost possible pleasure to the Address. One point that had struck him was in connection with carbonization. Mr. Madden had remarked that "from the small beginnings of little hand-shovelled retorts fired by direct heat, to-day we have continuous vertical retorts and chamber ovens." Evidently at Bath they were very much behind-hand, because they had only as yet got as far as horizontals. [Laughter.]

Mr. R. G. Shadbolt (Birmingham), as a visitor, and a very frequent one, asked to be allowed to support the vote, one reason being that this was a centenary, and coincided with his own family's 100 years' service in the Industry, commencing at Cambridge, with the advent there of gas lighting. The Address to which they had listened was a veritable *multum in parvo*, touching lightly, but skilfully, upon the salient features of the Industry's progress over the century-and-a-quarter of its existence, from the iron retort and cock-spur burner, to the very latest phases of to-day. The President had been careful to yield honour where honour was due, and his feeling of modesty was a dominant note throughout. What did they not owe to such a man as the President, who had rendered yeoman service throughout every phase of the Industry, and during the time of its greatest advancement? He had provided an outstanding instance of individual independence of outlook and application, coupled with the true "team spirit" of the practical investigator which was more necessary to-day than at any previous stage in the history of the Industry. In conclusion, he would second the President's plea to the junior members of the Association to gird themselves for the alluring endeavours which were their great heritage, and lay immediately before them.

Mr. John Terrace (London) remarked that he was somewhat at a disadvantage in rising to support the vote of thanks, because he had not arrived at the meeting when the proposer and seconder spoke. It was a great pleasure to be present on so important an occasion. He had the very greatest regard for Mr. Madden, whom he had the privilege of following in the Chair of The Institution of Gas Engineers. But he did not want to tell them about Mr. Madden, because they all knew him as well as he did. They knew what a sterling man he was, and that he was always there when wanted. It was an excellent idea to ask him to be President again in the centenary year of his Company.

Mr. W. Clark Jackson (Neath) remarked that the regard in which they held Mr. Madden in South Wales was so warm as to be almost hero worship. He had set them an example which they had endeavoured to live up to. To whatever seemed for the benefit of the Industry, Cardiff lent its aid in every possible way. He felt he could not let the occasion pass without expressing, on behalf of the members and of himself, their deep affection for the President. [Applause.]

The President, returning thanks for the kindly manner in which his Address had been received, said, with regard to Mr. Whimster's remark on carbonizing practice, that his own horizontal plant at Grangetown was quite as late as the verticals. He had seen Mr. Whimster's plant at Bath. It was a very good one, and he readily conceded that horizontals were not in any way defunct. Some things had been said by the various speakers which almost made him blush, but he did fully realize the importance of the "team spirit." In an industry like theirs, one must have this, and in Cardiff they always endeavoured to foster it. For everything he could do on behalf of South Wales, he invariably had the strongest support of his Board. Otherwise he could not have rendered to the Industry, in South Wales and nationally, such small service as he had performed. He took this opportunity of thanking his Directors for all their help to Mr. Auckland and himself in that work which was to-day so vital to them all.

Cardiff Gas Company Congratulated.

Mr. Stephen Lacey (President of The Institution of Gas Engineers) said he had never before attended a meeting of the Association, and he counted himself exceedingly fortunate that his first visit should take place on so memorable an occasion, and that he should have the privilege, in his official position, of offering congratulations to the Chairman and Directors of the Cardiff Gas Light Company on their centenary. Everyone who played a responsible part in the collective work of the Gas Industry knew that Cardiff was one of the foremost gas undertakings in the country, not merely on account of its size, but by reason of the vigorous and progressive spirit which it manifested in all branches of its activities in the service of the consumer, and by reason of its long-standing policy of wholehearted co-operation, whether regional or national, with other gas undertakings. The Directors of the Company had for years past shown themselves to be ever ready to give generous and unstinted support to collective action for the good of the Industry, and they possessed in their Engineer and Manager, Mr. Madden, a man outstandingly fitted to carry out such a policy, by reason of his sterling qualities of character, his long experience, and his ability. Whatever work Mr. Madden undertook—and there appeared to be no limit to it—he enhanced the reputation of his Company, of the Association, and of the Gas Industry. He held many offices, and was a most valued counsellor of the Institution. In 1928 he was President of that body—in a very important year, when all the preliminary work had to be done in connection with the application for the Charter, and all of them retained vivid recollections of the marvellous meeting in Cardiff that year, and of the generous hospitality of the Gas Company. [Applause.] He had great pleasure in formally proposing a vote of congratulation to the Chairman and Directors of the Cardiff Gas Light and Coke Company upon the attainment of the Company's centenary.

Mr. J. H. Canning (Newport) said he felt it a great honour to support this vote of congratulation to the Cardiff Gas Company. It was a vote they could pass wholeheartedly, for the Company were to be congratulated. The undertaking was far more vigorous to-day than a hundred years ago, and was still growing rapidly. A centenarian was usually inclined to look back into the past, but the Cardiff Gas Company had their eyes always fixed ahead, and with the progressive policy adopted by the Board would continue to go ahead even more rapidly than in the past. He was very glad to have this opportunity of congratulating Mr. Robert Williams upon his attainment of the position of Chairman of the Company. He believed that Mr. Williams's grandfather was the first Chairman, and that the grandfather was succeeded on the Board by the father. The Chairmanship was thus an hereditary position of which Mr. Williams must feel justly proud, and he hoped he might be long spared to occupy it. They were also very pleased to have with them the Vice-Chairman, Mr. James Miles. Many times they had had occasion to pass votes of thanks to the Cardiff Gas Company for the support they had given to this and other Associations, and the President had duly passed these votes on to them. Now they had an opportunity to give a vote of thanks personally to the Chairman, Vice-Chairman, and Directors, for all they had done for the Association and the Industry—and not least for the establishment of the Industrial Centre, which had been of such immense advantage to the district. It would not be fitting to omit from these thanks the two chief officers, Mr. Madden and Mr. Auckland, to whom they also owed much. He might remind the members that the Association owed Mr. Octavius Thomas to the Cardiff Gas Company, because he believed Mr. Thomas commenced his training with that Company well over sixty years ago.

Mr. Robert H. Williams, acknowledging the vote, which was agreed to with enthusiasm, said the Board were very pleased indeed that their Engineer and Manager had been elected President of the Association in the Company's centennial year. Mr. Madden had done more good for the South Wales gas undertakings than anybody else could have done. He was working for the Cardiff Gas Company, but the Industry got the benefit of his brains as well.

It was agreed that the place of next meeting should be left to the Council to decide.

The Centennial Year Luncheon.

The business over, members and others, to the total number of about 200, proceeded to the Park Hotel for luncheon, as the guests of the Cardiff Gas Light and Coke Company, by way of celebrating their centennial year. It was a happy occasion, marking an important stage in the existence of an undertaking famed throughout the Industry for which it has accomplished so much good work. In connection with the event, a booklet containing many interesting facts, and having an arresting cover, had been prepared; while an illustrated article of a more intimate character, dealing with "Cardiff—Then and Now," appeared on pp. 402-3 of the "Journal" dated May 19. Mr. Robert H. Williams, J.P., presided over the luncheon,

"Teeing-Up" for the "Nineteenth!"
A Happy Group at Penarth during the Golf Meeting.

at which, in addition to the Loyal Toast, two others were submitted.

The LORD MAYOR (Alderman Herbert Hiles, M.B.E., J.P.) proposed the first, which was "The Cardiff Gas Light and Coke Company." He remarked that the large gathering there that day was extremely gratifying to the hosts. A hundred years ago, when the Company started, the inhabitants of Cardiff numbered 7,000, and the Company had about 60 street lamps, and 75 private consumers. The undertaking had, however, grown to such an extent that there were now 67,000 consumers. In one way or another, the Company had always been connected in very hearty relationship with the Local Authorities. He knew there were some things the Gas Company could do very much better at the moment than the electricity people could. The Gas Company had given them very valuable help in the educational work of the city. Many years ago Mr. Clarry had assisted them in this way, and since then they had had the help of Mr. Madden and Mr. Auckland. They were therefore greatly indebted to the Company. The excellent feeling existing between the staff and the Directors, and among all ranks throughout the service, had much to do with the success of the undertaking.

In the course of his response, the CHAIRMAN pointed out that one way in which the Company had benefited the city was that there were now 66,000 gas fires in use, instead of coal fires, and there was also the same number of wash-boilers. An interesting fact in this connection to which he drew attention was that Sunday was now losing some of its load by reason of the motor car, and Monday, which used to be a slack day, had become the big day, because of the wash-boiler. The friendly relations which always existed between the City Council and the Gas Company were an important part of their policy. It was a pity that a great many more businesses had not the co-partnership system in operation, as it was potent for good.

The remaining toast was that of "The Association," proposed by Mr. A. W. SMITH, and acknowledged by Mr. MADDEN. Mr. Smith commented upon the admirable work done by the Association, which started in 1905 with a membership of 47, and to-day numbered about 150, while there had been but one Hon. Secretary in all this time. As for the President, he had at heart the motto: "Service, not Self." Mr. Madden remarked that there were quite a number of the original members of the Association present with them that day. He owed to Mr. Smith and to Birmingham more than he could ever repay for the help and advice he had received. Gas was a vast labour saver, and the working-class housewives of to-day had more amenities in their homes than the barons' wives of 400 years ago had in their castles.

The luncheon was brought to a close with the presentation by Mr. JAMES MILES, J.P., of the golf cups to Mr. F. Boardman and Mr. C. R. Averill.

The members then proceeded on a tour of the Grangetown Gas-Works, where they were entertained at tea.

Golf Competition.

On the previous day the Association Golf Cups were played for on the delightfully situated links of the Glamorgan Golf Club, Lower Penarth. The results of the morning and afternoon competitions were as follows:

UPJOHN CUP—MEDAL PLAY.

	G.	H.	N.
F. Boardman	88	13	75
R. J. Auckland	84	7	77
C. R. Averill	90	13	77
W. M. Fox	97	16	81
F. D. Drake	90	9	81
H. E. Bennet	90	7	83

WILFRED DEAN CUP—BOGEY SINGLES.

C. R. Averill	3 down
C. A. King	4 ,,
Eric Jones	4 ,,
W. C. Jackson	4 ,,

In the evening a party of about 45 sat down to the customary golf dinner at the Royal Hotel—Mr. Auckland presiding. There was no formal toast list, but the CHAIRMAN briefly welcomed the guests, and said he was sorry Mr. Sessions, the Captain of the Penarth Club, and Mr. Hammond, the Secretary, had been prevented from being present. They were, however, very pleased to have with them Mr. Robert Walker, the Club Professional. They ought, he went on, to express their appreciation of all that Mr. Joe Sadler had done for them that day. [Applause.] He had been of the greatest assistance to Mr. Thomas, and had looked after them all in an excellent manner. They would also like to compliment Mr. Sadler on having received a Coronation Medal from Buckingham Palace. Mr. SADLER thanked the Chairman for his kind remarks, and said the Medal was for 21 years' service as Reserve Constable. It was a pleasure to do anything he could working under his chief, Mr. Octavius Thomas. The health of the Chairman was drunk with musical honours.

Blackwell's Law of Public and Company Meetings*

This is the eighth edition of an extremely useful work; the first part of the book has been extensively revised in view of the passing of the Local Government Act, 1933, and the alterations effected by this Act have all been duly recorded. In addition, the passing of the Public Order Act, 1936, has rendered desirable a chapter on this Act and its effect on the general principles enumerated in the first two chapters of the work. Mr. Charles E. Scholefield, of the Middle Temple, Barrister-at-Law, is responsible for the first part of the book, which deals with "Public Meetings."

The second part, dealing with "Company Meetings," is by Mr. Richard Isdell-Carpenter, B.A., of Gray's Inn, Barrister-at-Law. The addition of English and Empire Digest references to the cases cited throughout the book add materially to the usefulness of the present edition in the Dominions and Colonies as well as in Great Britain itself. An index renders reference an easy task.

* London: Butterworth & Co. (Publishers), Ltd., Bell Yard, Temple Bar, E.C. 4. Price 6s. net. Pp. 248 + xxix. and Index.

WALES AND MONMOUTHSHIRE ASSOCIATION OF GAS ENGINEERS AND MANAGERS

The Presidential Address

OF

H. D. MADDEN, M.Inst.C.E., M.I.Mech.E.
(Engineer and Manager of the Cardiff Gas Light and Coke Company)

Presented at Annual Meeting of the Association held at Cardiff on May 27. A report of the further proceedings will be found elsewhere in this week's issue of the "JOURNAL."

In the first place, it is my desire to thank you very sincerely for your graceful compliment to my Company in offering me the Presidency of your Association in the year of my Company's Centenary, especially so, as the writer was not a member of your District Council. This is the third occasion on which I have occupied the office of your President during my thirty years of service in South Wales, and I thank you very sincerely for the honour you have again done me and for the many friendships I have formed during that period.

There is one friendship I should especially like to mention, that is, of Mr. Octavius Thomas, our Honorary Secretary. Indeed, he has been the friend of all the Presidents and members during the entire time since the Association was formed.

As it is my Company's Centennial Year, my reflections have been on the history of the great Gas Industry of which we are a part, and the achievements and development of our Industry from its small beginnings. When one examines the events that have led up to to-day's position it is a remarkable history, and it is this theme I should like to deal with in this Presidential Address.

We give the credit to Murdoch for his skill and resource in introducing the production and practical utilization of coal gas for public and domestic lighting, after centuries of dependence on candles and oil lamps for illuminating purposes; but it is an historical fact that gas was distilled from coal earlier still by Dr. Watson, Bishop of Llandaff, about 1781. Llandaff is now within the City of Cardiff. Previously Dr. Watson was Professor of Chemistry and Divinity at Cambridge, but churchmen in the Diocese of Llandaff will hardly remember him with reverence, for we are told

> "He was appointed Bishop of Llandaff in South Wales and went to live for 34 years at his delightful seat of Calgarth Park in Westmoreland, with occasional visitations to his diocese which were as short as they were few."

In his records he states that "Coak was an article of trade" before his experiments on coal gas were made.

From the small beginning of little hand-shovelled retorts fired by direct heat, to-day we have continuous vertical retorts and chamber ovens—scientific plants not obtained by one quick move but by the trend of constant research over a period of 120 years. Unquestionably, the last twenty years have seen greater developments and results by research than in all the previous history of gas, not only in regard to works processes and distribution, but also to gas-consuming appliances.

Another feature of this period is the recognition of the potentialities of the Press for publicity and propaganda purposes in bringing the value of our manufactured articles and our services directly and consistently to the notice of the Public. It is impossible to realize what the Industry owes to the combined efforts of its members, the British Commercial Gas Association, and the National and Local Press of this country. Competition will necessitate even greater efforts in this direction in future years, and we must realize the vital importance and value of propaganda designed by experts skilled in the publicity world.

One hundred and twenty-five years ago there was founded what is known to-day as the Gas Light and Coke Company in London—a small beginning at Westminster for lighting the streets of London by direct combustion of gas in street lanterns with burners of a curious type, these streets having previously been illuminated by oil lamps. Pall Mall was so lighted one hundred and twenty-five years ago, and it is still lighted by gas, as in fact are so many of the well-known streets of the West End and Whitehall, while the lamps around the outer wall of the Houses of Parliament are gas-lighted. High-pressure gas lighting is very largely adopted in the most famous streets of the Metropolis.

The research of Bunsen and the discovery of what is now called the Bunsen Burner, together with the investigations of Welsbach into the rare earths for the impregnation of the mantle structure, gave us modern incandescent lighting. My earliest recollections of lighting in London are of the flat flame lamps of the streets, and the chandeliers with similar burners in the home, giving an illuminating power of two candles per cubic foot. To-day, the superheater incandescent burner used for domestic lighting gives as much as 40 c.p. for the consumption of a cubic foot of gas.

Some fifty years ago, in addition to lighting, gas was introduced for domestic cooking and heating purposes, but the appliances of that time bore no resemblance to those in use to-day, thanks to the important investigations and research carried out by the makers of appliances, and which they are still assiduously carrying on. During my period of service with the Industry, the 90% lighting load has been converted to a 90% heating load, but there is now a gradual reawakening to the many advantages of gas for lighting purposes, especially in the cottage home, where light, warmth, and ventilation are provided at an economical rate by the same penny that provides gas to cook the meal. It is surprising to find in the homes of to-day so many cold halls and staircases. My experience is that gas lighting in the hall takes the chill out of the air, and one can move from one room to another without that feeling of discomfort.

The advent of the gas engine for power purposes enabled factories and workshops to utilize a form of power which occupied small floor space and could be started and stopped when required, without loss of fuel. The improvements made in the gas engine made possible the motor car, though very few drivers of cars realize this fact, or the fact itself that they are driving a gas engine. It is a modern form of travel with the gas engine pressed into service, utilizing spirit vapour as the power fuel. Benzole from gas-works is undoubtedly the best spirit for motor cars, and it has the advantage of being a nationally produced oil from our own coal.

Gas in Industry.

As the years advanced, a new outlet for gas was found. I refer to the commercial and industrial processes which to-day are deriving enormous benefit from its use. Birmingham, with its large number of small industries dependent upon heat treatment, was the pioneer in this direction, and, after careful examination of the question, research centres have been set up in various districts of the country and these are now linked together by a Central Committee, which co-ordinates and disseminates the knowledge and experience gained in the various centres. This arrangement saves a great deal of time in dealing with problems that arise in any particular district, and the close co-operation of these centres will ultimately be of great benefit to the Industry as a whole. I believe that in the course of the next few years there will be still further enormous development in the use of gas for commerce and industry. It has so many advantages in process work. Reducing or oxidizing atmospheres can be set at will, and the ease and cleanliness of its manipulation are great points in its favour. Industrialists are recognizing these advantages and there is a growing demand for gaseous fuel for central heating and heat process work.

One is apt to lose sight of the ratio of the relative costs of power and heat to the finished article in the modern workshop or factory. It has been estimated that power costs rarely exceed 2% on the cost of the finished article, but heat treatment charges are very much greater and more important in the analysis of manufacturing costs.

A striking example of this is provided here in Cardiff at the re-constructed works of Messrs. Guest, Keen, Baldwins Iron and Steel Co., Ltd., where a large battery of gas-producing coke ovens to carbonize over 1,000 tons per day has been installed, complete with two large gasholders of the waterless type, to provide these famous iron and steel

works with the necessary and requisite supplies of solid and gaseous fuel for heat treatment purposes.

On the subject of the increasing use of gas for industrial purposes, it is interesting to note that the *Gas Age Record* recently stated that for the year 1936 the sale of gas for industrial purposes in the United States of America had increased 22% over the year 1935.

The Gas Industry in its long period of service has progressively done much to ameliorate the lot of the housewife by the abolition of household drudgery. The perfection of the gas cooker with its automatic regulation of heat, its quality of being easily cleaned, and the value of its instantaneous use, is an asset in eight million homes.

The modern gas washing machine has abolished the old household dread of the antiquated copper and laborious washing day. That unpleasant universal Monday morning task is now rendered perfectly easy, and the time occupied in the operation is reduced considerably.

Water heating has reached a stage of high efficiency, both in the appliance and its economical operation. Instantaneous supplies of hot water and storage heaters, the luxury of yesterday, are household necessities to-day.

Gas fires, especially for rooms used intermittently, have reduced household labour and expenses, and it is not too much to say that by all these apparatus the Gas Industry has rendered practically possible the elimination of the daily round of laborious household work.

In the unhappy time of war the nation is dependent on the Gas Industry (and I include the Coke Oven Industry) for its enormous requirements of high explosives, antiseptics, and very large quantities of light oils for various military purposes. In fact, it is not too much to say that the military protection of our islands and sea routes is dependent upon the vast quantities of such material that the Gas Industry can supply, and did, in fact, supply during the Great War.

In 1920 a great advance was made by the introduction of the Gas Regulation Act, which enabled gas undertakings to supply gas on a thermal or heat basis, supplanting the direct illuminating power test which had become obsolete through the introduction of incandescent lighting, and also because of the growth of the gas supply for purposes for which heat value only could be the rational standard of test.

This Act, a Charter of Freedom, gave the Industry a great impetus by enabling gas undertakings to declare a thermal standard, suitable to local conditions, and it has made progress possible in the development of gas for commercial heat purposes in industrial processes. A reduction of overhead charges is experienced, especially so in cases of works where surplus manufacturing plant is available, when a single consumer takes a large quantity of gas for industrial load.

Great Leaders of the Industry.

Let us now take a brief look back over the history of our Industry, and the leaders it has been our good fortune to have, in such men as Sir George Livesey and Sir Arthur Duckham, technicians and able business men of strong personality, and pioneers—the former initiating Co-partnership in industry, which has developed so remarkably in our own sphere of work.

The late Sir Corbet Woodall, Consulting and Parliamentary Engineer and some time Governor of the Gas Light and Coke Company, did much to advance the Industry.

With us to-day, Dr. Carpenter, of the South Metropolitan Company, who succeeded Sir George Livesey, and was imbued with his traditions, has done much for the advance of research, and particularly so in initiating the practice of coal carbonization to the highest pitch of efficiency from existing plant of the horizontal type which appeared likely to be overshadowed by the introduction of the continuous vertical retort installations.

As leader of the Gas Industry to-day, Sir David Milne-Watson appeared at the time and hour of necessity and undoubtedly, by his vision and leadership, has done more for the consolidation of the Industry than any single man in its history. The Institution of Gas Engineers, the British Commercial Gas Association, and the National Gas Council are remarkable for the work they have individually performed, but the formation of the British Gas Federation has welded the individual forces of each Association into a strong spearhead of efficiency.

The gigantic Undertaking of the Gas Light and Coke Company and its tremendous development are due to the initiative of their Governor, and we, one and all, pay tribute to and thank Sir David for the generous assistance that he has given us individually and collectively in so many ways.

The Trend Towards Grouping.

What is the trend of events in the Industry to-day? There is no doubt that the tendency is for manufacture to be centralized and large units of gas plant employed to reduce carbonizing and manufacturing charges—with the resultant closing down of small units, and utilizing such works solely as storage and distribution centres.

During recent years holding companies have appeared on the scene, and a large number of gas undertakings have sold out to these group holding companies, which are in a strong financial position and have large reserves of money to develop undertakings so transferred. Whether we like it or not, there is no doubt that many benefits are to be obtained by a number of small or medium sized undertakings being welded together in such a commonwealth. Purchases of stores and supplies can be made more economically by the central purchasing authority, and staff resources are available to each and any undertaking in the group which would not be so available if each acted as an individual unit. Such a consolidation undoubtedly strengthens the position, and the resources of such a group enable it to develop and meet competition much more effectively than small individual units could possibly do.

Another development of the last few years is the noticeably closer co-operation between gas undertakings and the coke oven industry, with a clearer conception of each others' difficulties and obligations. As a classic example of this the Sheffield Gas Company may be cited, inasmuch as they have formed contracts with a number of surrounding coke oven plants to take supplies of gas that would have otherwise been burned to waste at the ovens. Sheffield's arrangements are mutually beneficial—the Gas Company is enabled to sell large volumes of gas for commercial purposes, and in so doing provides the steel and other industries in that area with a cheap and abundant supply of gaseous fuel for heat treatment purposes.

A number of other undertakings, such as Newcastle, Rotherham, &c., have made similar arrangements, and this method of co-operation is rapidly developing. Unquestionably, in the very near future, greater use will be made of gas produced from coke ovens to the benefit of all classes of gas consumers, and also coal producers.

Again, in the question of the sale of coke for export purposes the two industries have got closely together in a real joint effort to safeguard the shipment of coke, in relation to its quantity and its economic selling price.

The Coal Situation.

Coal is the life blood of the Gas Industry, and we have watched the working and effect of the Coal Mines Act with some anxiety. Let us hope that the setting up of the District Joint Consultative Committees may constitute an arrangement whereby the sellers will listen attentively to, and appreciate the position of, the gas members in regard to coal prices and their effect on the general public who use gas daily for domestic purposes.

The Gas Industry is one of the most important National Public Utility Services—and vital to the nation in time of war or the preparation of safeguards against its dangers. Carbonizing some 18 million tons of coal per annum (and together with the coke oven industry some 30 million tons of coal) it provides regular work for many thousands of miners; transport from the mines to the gas-works gives employment to shipping and railway workers; and the export of coke and residuals brings additional revenue to the railways, docks, and shipping.

The Writer believes that the public and the nation generally are awakening to a realization that the Gas Industry is a very great national asset, invaluable to individual homes and commercial undertakings for the supply of a clean fuel on tap at all hours of the day and night. It is realized, too, that coal, that complex mineral, is being scientifically treated in our Industry by the process of constructive distillation, whereby 80% of its energy is available and returned to the public in the forms of gas and coke—the smokeless fuels—tar and its derivatives for roadmaking, benzole for motor propulsion purposes, toluole for high explosives, naphtha oils, creosote oils, and pitch and the numerous synthetic compounds, especially the aniline series of dyes.

In conclusion, the Writer desires to express his personal thanks to all members of the Wales and Monmouthshire Association for his year of office as their President, with an appeal for the third and last time that the younger members, according to tradition, will come along and seize the torch and carry it onwards along the pathway of progress to a greater destiny than we can ever conceive, and to a sphere of usefulness outlined by the prophetic utterances of the late Lord Moulton, when he was President of our Institution. The spirit he expressed may be summed up by the words

"BY RESEARCH WE SERVE."

Eastern Counties Association

Under the delightful conditions which were recorded in last week's issue of the "JOURNAL," the 93rd half-yearly meeting of the Eastern Counties Gas Engineers' and Managers' Association was held in the Moot Hall, at Aldeburgh, on Friday, May 21, under the presidency of Mr. C. R. FOWLER, of Leiston. The business proceedings occupied the morning of a well-filled day.

A Genial President Amid the Ruins of Framlingham Castle.

HALF-YEARLY MEETING

AT

ALDEBURGH

FRIDAY, MAY 21, 1937

The minutes of the last meeting having been confirmed, the HON. SECRETARY and TREASURER (Mr. W. C. Chapman, of Boston) announced the receipt of a number of letters apologizing for absence.

The PRESIDENT said it was with regret that he had to refer to the loss the Association had sustained since the last meeting by the deaths of one member and two associate members. The member was Mr. E. E. Grimwood, of Lavenham, who had been connected with the Association for a great many years, and was one of a very highly respected family of Suffolk engineers. The Associate members were Mr. C. Clare, of London, and Mr. W. Jones, of Felixstowe. Mr. Clare came into the Association in 1902, and had a wide circle of business friends, but in recent years he had not attended very many of their own meetings. In Mr. Jones they had lost a dear old friend, who had been an associate member for thirty years, and was the founder of the President's Benevolent Fund. They had great reason to be thankful to him for his valuable help. A wreath had been sent in each instance, and the Hon. Secretary had forwarded letters of condolence to the relatives.

As a mark of respect, members stood silently in their places.

Membership.

The PRESIDENT next reported the resignation of a member, Mr. W. E. Plevin, of Romford, and an associate member, Mr. A. L. Griffith, of London, who recently retired from the Secretaryship of the Society of British Gas Industries. Also, one member had been written off under Rule 20.

The following additions were made to the membership:

Members.—J. Cook (Bletchley), T. J. Enright (Lincoln), A. E. Scott (London), and N. W. Moore (Sileby).
Associate Member.—W. J. C. Cotton (Sandiacre).

The elections were made on the proposition of Col. J. KENNINGTON (Grimsby), seconded by Mr. F. H. ROBINSON (Bishop's Stortford).

The PRESIDENT said his next duty was a very pleasant one—to present, on behalf of the Association, the customary Gold Medal to the retiring President, Mr. George Wright, who had carried out his duties with quiet and modest demeanour, accompanied by well-ordered efficiency. All of them retained many happy memories of his Presidency, and of his model, and delightfully situated, gas-works at Lincoln.

Mr. GEORGE WRIGHT said he greatly appreciated the presentation, and the medal would serve to remind him of a very happy year of office, which he had thoroughly enjoyed, and which had enabled him to make many new friends.

Committee's Report and Balance-Sheet.

The Committee's report and the balance-sheet were then presented, showing in the general fund a balance in hand on Dec. 31 of £131 4s. 3d. The amount standing to the

Nottingham and Manchester in Collaboration.

The Hon. Secretary (centre) with two Fellow-Members.

Mr. G. A. Mallett and Mr. P. D. Walmsley.

credit of the President's Benevolent Fund at the same date was £133 16s. 5d., almost the whole of which is invested in the Abbey Road Building Society. The Committee gratefully recorded a donation of £5 5s. from the Eastern Commercial Section for the Benevolent Fund. There was also incorporated in the general fund a sum of £4 13s. representing a credit to the Benevolent Fund. The Committee recommended that a sum of £15 2s. be voted from the general fund, in order that a new £25 share should be invested in the Abbey Road Building Society to the credit of the Benevolent Fund.

On the proposition of Mr. P. D. WALMSLEY (Great Yarmouth), seconded by Mr. S. HANDS (Sleaford), the Committee's report and recommendation were agreed to.

It was further decided that a donation of £10 10s. should be made to the Institution Benevolent Fund; the proposer in this case being Mr. C. E. WRIGHT (Ipswich), and the seconder Mr. C. E. BYRT (Gainsborough).

Mr. E. F. KEABLE (Gorleston), presenting the Education Scheme and Salesmanship Course Report, for the year 1935-36, said it had again been the Committee's pleasure to assist students in various ways, and arrangements had been made at several centres for students to take 1937 examinations under The Institution of Gas Engineers. Gas-fitting classes had again been well attended, with a total of 75, as compared with 66 in the previous year. Of these, 22 were studying for the final examination. The Committee desired once more to record their appreciation of the work done by the tutors of these classes, and were indebted to the Board of Education for the Short Courses for Teachers which were again held, the gas undertakings who had made the training possible and for encouragement given by prize awards, and to the Education Authorities in the cities and towns concerned for their continued and valued co-operation. Thanks were also due to the Engineers at Norwich, Cambridge, Colchester, Ipswich, Lincoln, and Great Yarmouth, for having furnished competent examiners for the Practical Gas-Fitting Examination. The Committee expressed the hope that the training secured would be used to the full by the undertakings concerned, and that due recognition would be given to fitters and others who thus qualified for higher service in the Industry.

The number of students taking the Domestic Salesmanship Course during the session under review was four. The Committee arranged the examinations, and sincerely thanked the Engineers of those undertakings who allowed the examinations to be held upon their premises, and provided suitable supervisors. In view of the increasing competition, every salesman was urged to take advantage of this valuable scheme.

The PRESIDENT remarked that Mr. Keable, as Hon. Secretary of the Committee, always presented them with a clear and concise report of their activities, and they were greatly indebted to him for the time and attention that he devoted to the matter.

The report was adopted, on the proposition of Mr. J. GREEN (Wisbech), seconded by Mr. A. L. HIGHAM (King's Lynn).

Mr. FOWLER then proceeded to deliver his Presidential Address, which is published on other pages of this issue.

On the proposition of Mr. THOMAS GLOVER (Norwich), it was agreed that the next meeting should take place at Bedford, when the Le Bas Works would be visited.

Parkinson & Cowan, Ltd.

Considerably Improved Position—Preference Arrears Paid

Lt.-Col. Woodall on the Outlook

The 37th ordinary general meeting of Parkinson & Cowan, Ltd., was held on May 28, at the Grosvenor Hotel, Victoria, London, S.W. Lieut.-Colonel HAROLD W. WOODALL, C.I.E., M.Inst.C.E. (Chairman and Managing Director), presided.

The SECRETARY (Mr. A. Gordon, F.C.I.S.) having read the notice convening the meeting and the report of the Auditors,

The CHAIRMAN, in the course of his speech, said: Turning to the profit and loss account, you will, I hope, be pleased to note the decided improvement in the net profit for the year, namely, £44,641, as compared with £15,114 in 1935. This is due largely to the increased dividends received from subsidiaries and reflects their better trading results. It does not, however, measure the full improvement in the Company's position because, as mentioned in the Directors' report, the reserve account has been increased by some £18,128 and the surplus profits left in subsidiaries have risen by rather more than £20,000.

Another aspect which I hope you will find satisfactory, is that all the trading subsidiaries have extinguished their previous losses and start the current year with credit balances in their profit and loss accounts. Taken altogether, the figures provide, I think, justification for the optimism that I ventured to express in the remarks that I addressed to you last year.

Clearance of Preference Arrears.

In the present unsettled state of affairs, your Directors feel that they are called upon to exercise a particularly conservative financial policy, but they cannot be blind to the fact that outstanding arrears of preference dividend are prejudicial to the credit of a Company. In these circumstances they are extinguishing all arrears by paying a full year's preference dividend to-day. Your Directors regret that, as yet, they are unable to recommend any dividend payment on the ordinary shares, but shareholders may take comfort from the fact that the clearance of preference arrears is a first step in this direction.

New Plant Delivery Delays.—Since last we met, very useful additions to our works have been completed, but we are still hampered by our inability to secure delivery of plant and apparatus ordered many months ago.

Research Progress.—Our laboratories continue to do admirable work in improving existing apparatus and introducing new models. The design and quality of our goods is fully maintained and favourably commented on. In cooker design, I think we can fairly claim to be in the lead. In this connection, may I appeal to all shareholders to assist our efforts by purchasing Parkinson products and recommending them to others? Our "Renown," a cooker of revolutionary design, is everything that a gas cooker should be, both in appearance and performance, and we hope that shareholders will add their efforts to ours in bringing it before the notice of the public.

Our relations with our employees have been of a happy nature over a long period of years, and it will always be our endeavour to maintain them on as cordial and pleasant lines as possible. In spite of this, we were involved in a regrettable dispute with some of our employees early in the year. No good purpose can be served by going into details, but the result was, as in so many similar instances, a financial loss to both sides, with no compensating advantage to either.

N.D.C. Tax.—The revised taxation proposals of the Chancellor of the Exchequer under the National Defence Contribution Scheme, do little to correct the inequity of the incidence of the tax against which there has been—and still is—so much adverse criticism from the business world. Rearmament is a regrettable necessity which we all deplore, but the wisdom of which we cannot question, and we are, I am sure, all willing to bear our fair share of taxation for this purpose. Unfortunately, the principle of taxing abnormal profits resulting from rearmament, though admirable in theory, cannot be worked out in practice. The administrative complications introduced by the Bill will involve an incalculable cost to industry and the Revenue. Apparently an annual capital revaluation will be necessary in many cases, and the very heavy work and cost of ascertaining the liability will mean time and money completely thrown away.

The Outlook.—If these were normal times I could confidently say that we have won out of our difficulties. Unfortunately, one can hardly say this. Industry to-day is carried on under War-time conditions. Pig iron is already rationed and there is a serious shortage of steel and of most other raw materials, with rising production costs. We have, as you would expect, made contracts ahead to the limit that our suppliers would accept, but, in common with other manufacturers, we are experiencing great difficulty in securing deliveries.

Up to the present, our output has been well maintained, and though profits have been affected in some directions by causes already alluded to, shareholders may rest assured that in spite of difficulties your Directors are making every effort to further the encouraging improvement shown in the accounts before you.

Tribute to Officials and Staff.

In these efforts they are loyally supported by their staff, to whose zeal and efficiency is due much of the satisfactory progress made during the past year. Our chief official positions are now occupied by young men, some of whom have brought with them experience gained in other spheres of activity, which is proving of great service in the conduct of the business of your Company.

On behalf of myself and my colleagues, I wish once again to express our thanks and appreciation to all grades of staff and workers for their help and co-operation during the past year.

The report and accounts were unanimously adopted; the retiring Directors and Auditors were re-elected and the proceedings terminated with a vote of thanks to the Chairman, Directors, and staff.

EASTERN COUNTIES GAS ENGINEERS' AND MANAGERS' ASSOCIATION

THE PRESIDENT.

Mr. C. R. Fowler received his early training with the Croydon Gas Company, being appointed Manager of the Leiston Gas Company in 1918. He took over the Management of the Aldeburgh Company upon its acquisition by the British Gas Light Company in 1928.

Presidential Address

OF

C. R. FOWLER

(Manager of the Leiston and Aldeburgh Gas Companies)

Presented at the Half-Yearly Meeting of the Association held at Aldeburgh on May 20 and 21.

When you did me the honour of electing me your President, I realized it would not be easy to give an Address so interesting or instructive as it is the custom to deliver from this Presidential chair.

The reason for this is twofold—first, because the Works of which I am in charge are small and therefore not equipped with machinery for production on large-scale operations; and, secondly, as they are comparatively new, it is not possible to give a report of progress over a long period of time. I propose, therefore, mainly to confine my remarks to a short history of the Company, and developments which have been carried out particularly during the last ten years.

Previous to the year 1911, gas was supplied to the town of Leiston from the private works of Messrs. Richard Garrett & Sons, Ltd., who themselves used a considerable quantity in their business as manufacturers of agricultural machinery, tractors, &c.

The growth of the town and the extension of Messrs. Garrett's works necessitated the building of a larger works, and for this purpose the Leiston Gas Company was formed in 1910 with strong local interest, and the present gas-works, to the design of Messrs. Corbet Woodall & Sons, was built on 1½ acres of land in Carr Avenue.

While the works were being built, new mains were laid through the district. In 1911 it was unusual for steel mains to be specified, and we were the second small Company to lay all-steel mains throughout the district. The decision has been ampy justified. and after twenty-five years' use they are found to be in a condition equal to new whenever exposed for service tapping. The works were opened on Aug. 1, 1911. Forty-seven consumers were transferred from the old private mains, and within a few months some hundreds more were connected to the new supply.

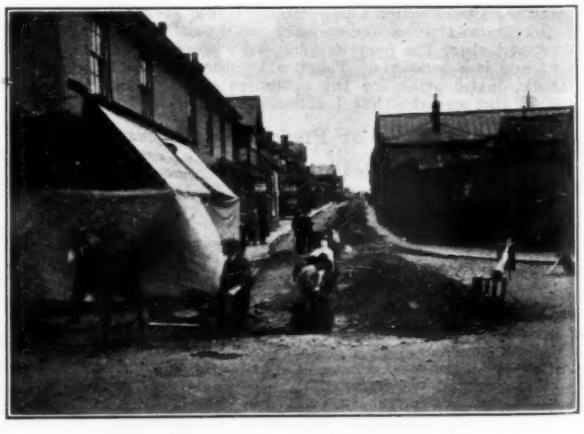
Leiston came into temporary prominence in 1916, when the local Council not only declined to pay the contract charge for public lighting which had then been interrupted by the military authorities, but they also refused to consider contributing anything towards the standing charges which the Company, under their part of the contract, were committed to. After using every persuasion on the Council to arbitrate or settle the matter by conciliatory means—which they felt unable to accede to—there was left no alternative but to take the matter to the High Court, which returned a verdict in favour of the Company. Against this the Council appealed, but their appeal was dismissed. The result of this law case was afterwards regarded as a kind of precedent to other undertakings who were unable to agree with their local authorities on the question of their public lighting obligations during those difficult days.

The Engineering Works were by far our largest consumer—at one time taking 60% of our output. After the war the export trade in agricultural machinery declined with the result that very much less labour was employed and ultimately they ceased to remain our largest consumer.

Acquired by British Gas Light Company.

Perhaps the most outstanding event in the short history of the Company occurred when the British Gas Light Company obtained this undertaking as the first of their East Anglian acquisitions in 1926. Immediately this was accomplished it was thought desirable to lay gas to Thorpeness, a seaside village 4 miles from Leiston. For this purpose a power house was built, compressors were installed, and a 4-in. high-pressure steel main laid to the entrance of the village. Here a governor was inserted and the pressure reduced to district needs.

In connection with the high-pressure main it is of interest to state we commenced to lay this half-a-mile from the gas-works, one gang working back, the other forward. The reason for this was because a supply of compressed air was available from Messrs. Garrett's Engineering Works, and by coupling up with this at the commencement of our mainlaying operations we were able to test the main as it was being laid and throughout the whole length without the aid of a portable compressor. This



Laying High Pressure Main in High Street, Leiston.

extension was naturally a rather costly matter, and as there is a very small permanent population at Thorpeness we obtain the bulk of our consumption from the visitors in the summer season. Nearly every house in the village has gas installed, and 90% use gas for cooking.

It was not expected that the revenue from the village would immediately provide a reasonable return upon the outlay, but with additional houses since built and an in-

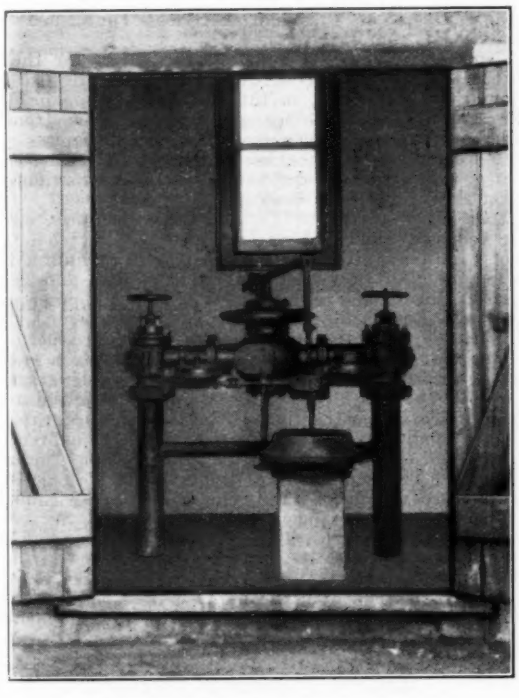
creasing demand for gas in the hotels and clubs, it is now beginning to contribute a fair return on the capital employed. There is, of course, another aspect; it has had the effect of keeping the advantages of gas before the tenants and there is every reason to believe they do very much appreciate its benefits, especially in the holiday season.

The Thorpeness demand had the result of increasing our summer sales, but it was felt the compressing plant should be employed to good purpose all the year round. Accordingly in 1928 with this object in view, the Directors acquired the share capital of the Aldeburgh Gas Light Company, a 10-million undertaking on the coast 4½ miles from Leiston.

Just before they obtained control the Aldeburgh Works had been modernized, a new retort bench and holder built, and additional plant installed. The mains, however, were in a very unsatisfactory condition, being both old and small; it was therefore decided to relay the whole district with larger mains and carry out some small extensions to connect new property. Here again steel was wholly employed, and while the work was in progress, a mile of 4-in. main was laid alongside a 6-in. low-pressure main in the direction of Leiston, with the intention of ultimately coupling up with the Thorpeness high-pressure main three miles away.

Services Relaid.

During the district survey it was found expedient to relay practically all the services and exchange most of



Thorpeness High-Pressure Governor.

the old meters, many of which were private property. This resulted in putting the district in thorough order and at the same time reducing the quantity of gas unaccounted for by over 25%.

The high-pressure main supplying Thorpeness was extended to Aldeburgh, an oil type high-pressure governor and "Connersville" meter installed, and the works closed down for gas-making purposes in 1930, the holders being served by a hand-operated valve according to local requirements. In course of time the whole of the manufacturing plant at Aldeburgh was dismantled, and the redundant buildings were leased to a Company who have proved to be very large consumers.

The addition of 13 millions a year proved most convenient to Leiston from a manufacturing point of view, and it speaks well for the foresight and vision of the Engineers who planned Leiston gas-works that no additional storage or plant was required, or any further capital expended on works to deal with this extra make. The connection with the Aldeburgh undertaking not only doubled the Leiston output, but also made the holiday period our peak demand. It provided two distinct services to districts of different character—Leiston almost entirely industrial, and Aldeburgh largely residential and hotel consumers. It is a matter of interest to mention that the average consumption per consumer at Aldeburgh is double that at Leiston.

It may be thought that the linking up of two districts within a few miles of each other would be bound to result in substantial economies. No doubt this would be so were the undertakings of medium size. In this particular case certain important economies were effected, although the saving on coal carting from station to works was more than offset by the extra cost of delivery on coke from Leiston to Aldeburgh customers.

The Aldeburgh Company.

The Aldeburgh Company was formed in 1856, just at the time a number of companies were commencing to give a supply of gas—principally for lighting—in various small towns in Suffolk. Quite a number of East Anglian works were built about that time and in many cases owe their inception to the vision and enterprise of a few local inhabitants, who not only believed gas to be a necessity for the well-being of their towns, but who were prepared to confirm their belief by providing a large proportion of the capital required to establish a supply. For years many of these small Companies must have experienced a very placid existence, accepting what business came their way and entirely undisturbed by serious competition of any kind. It may not be generally known there are many towns in the Eastern Counties which have received a public supply of electricity only within the last seven or eight years.

It is impossible for little concerns fully to share the benefits of inventions associated with modern gas-making practice on large-scale operations. Indeed, the method of charging retorts has remained unaltered on most small works, not because there are not other ways than hand-charging, but because it is still the most convenient practice in ordinary circumstances associated with little works. To-day the small works are becoming less parochial in character, and are able fully to share the benefits to be obtained, and so reasonably obtained, from those organizations within the Industry whose objects are to promote the well-being and prosperity of their members.

There is practically no part, certainly no important part, in our affairs which does not have proper and adequate representation. The National Gas Council are ever watchful in our interests. Two important bodies actively assist in the satisfactory marketing of residuals. We are much indebted to the British Commercial Gas Association for the progress the Industry has made during the past 25 years. Nor must we forget our local Associations such as we represent here to-day. Each do their own good work, and, with a unity of purpose, all have contributed their share in the welfare of this great Industry in which we serve.

Vote of Thanks.

Mr. G. WRIGHT (Lincoln), proposing a hearty vote of thanks, said what they had heard proved that, whether their undertakings were large or small, they all had their own particular problems to solve. The Address also gave clear indications of the beneficial results that accrued from the amalgamation of these small undertakings.

Mr. W. W. TOWNSEND (Colchester), who seconded, remarked that the President had told them a plain tale, and had revealed one of the sources of strength of their Association, as the Address illustrated the diversity of their membership, and of the problems which they had to face. A year ago they visited a very fine municipal works in a large city, while this year they had been invited to consider a totally different, though equally attractive, proposition, related to scattered places with small populations. It was not at all an easy matter to run small works efficiently and economically. Mr. Fowler had shown great grasp of his subject, and he congratulated him. It was interesting to note how these small works had been linked up, and to learn that the courage shown in laying steel mains so long ago as 1911 had been rewarded. In connection with linking-up, if gas production was centralized there was the difficulty that coke production also was centralized, and there arose the problem of transporting it to the other parts of the area. The President had won golden opinions from his colleagues in the Industry during many years, and these opinions would be enhanced by the way in which he had conducted the meeting, and by his Address. [Applause.]

The PRESIDENT expressed his indebtedness to the members for the vote, and remarked that, so far as steel mains were concerned, the policy referred to in the Address had been fully justified.

The Midland Association at Chesterfield

Members of the Midland Association with the Mayor of Chesterfield and Alderman George Clark (Chairman of the Gas Committee) outside the Station Hotel after luncheon.

Mention of Chesterfield immediately calls to mind a wide variety of associations to the Gas Industry ; for in and around this ancient Borough are situated many industries whose names are household words among Gas Engineers at the present time.

It was not surprising, therefore, to find that an unusually large number of members of the Midland Association of Gas Engineers and Managers took the opportunity of visiting Chesterfield on May 26 for their Spring Meeting. Nor was it any the less a compliment to their President, Mr. Harold Davies, to whose capable hands is entrusted the management of the local Gas Department, that so excellent a muster accepted the generous hospitality of the Mayor and Corporation, which contributed so substantially to the enjoyment of a day which will long be remembered as one of outstanding interest.

Almost within a stone's throw of some of the loveliest hills and dales and rolling moors of Derbyshire, Chesterfield has developed into a centre for many diverse industries, which are dependent upon the cheap and readily accessible supply of fuel—both solid and gaseous—in which the district abounds; and the Borough Gas Department plays no unimportant part in the provision of the latter.

Apart from the fine Hall erected during the 'seventies of the last century to the memory of the great railway engineer, George Stephenson, who spent his last years at Tapton House, Chesterfield, the town's chief claim to notoriety lies, of course, in the peculiar landmark provided by the spire of the fourteenth century church of All Saints. The 228-ft. lead-covered timber spire of this church has a most pronounced and, from some angles, perilous-looking twist, the like of which is not to be seen, it is believed, anywhere else in the world. The spire is perfectly safe and strong in spite of this; it has been crooked for hundreds of years, and nobody seems in the least concerned about it. There is no authenticated historical explanation of this peculiarity; but despite certain local superstitions variously associated with the activities of no less a celebrity than the Devil himself, it is now generally accepted that the twist is, to some extent at any rate, attributable to the effect of the sun's heat upon the lead covering.

Much more of interest could be written of the growth and development of this ancient and progressive Borough; but the visit of the Midland Association was primarily concerned with Chesterfield as an industrial centre. And it was therefore appropriate that the meeting should have commenced with an inspection of one of the town's principal undertakings—the Gas Department—which has filled so prominent a rôle in assisting local industries to attain their present state of prosperity.

The Gas-Works.

The Chesterfield Gas-Works occupy a long narrow site, with railway siding access for raw materials. The carbonizing plant, which was put down in 1924, consists of six beds of ten 24 in. by 18 in. section silica horizontal retorts, equipped with charging machinery. Horizontal retorts were considered best in view of the class of coal available. After twelve years' service the plant continues to give good service as a result of careful maintenance. There is in addition a water gas plant; and it must be remembered that a large amount of coke oven gas is purchased from neighbouring works. Interesting reference to the economics of the coke oven gas supply was made by Mr. Davies in the course of his Presidential Address (published in the "JOURNAL" for March 17).

A special room is set apart at the works for the continuous testing of the coke oven gas; and here also is an automatic valve which, in the event of a stoppage of the coke oven supply, enables gas to pass back from the holders via the coke oven mains to those premises which are fed directly along the line of that main. The Department's requirements are met up to a maximum of 1,300,000 cu.ft. of coke oven gas per diem.

Other plant at the works includes condensers, exhausters, washers, and scrubbers, which were erected in 1925, all of 2 million cu.ft. per diem capacity, a calcium chloride gas-drying plant, together with naphthalene and benzole plant. One of the station meters is a "Connersville" rated at 65,000 cu.ft. per hour.

Particular attention is paid to coke production at Chesterfield, coke being conveyed by telpher to a movable grading plant running on lines for the whole length of the storage hoppers, which are of reinforced concrete and of rather unusual construction. They are divided into four sections longitudinally, the two outer sections receiving the screened coke and each of the inner sections the breeze and nuts. The sections are proportioned to receive the average production of the respective sizes, without the intervention of any special cutting plant. Six central outlet slides are provided beneath each hopper for loading into trucks or lorries.

The up-to-date meter repair shops and stores were also inspected, together with the two gas-fired central heating boilers which serve the requirements of these departments and the works offices.

Modern Showroom Premises.

The Chesterfield Gas Department have every reason to be proud of their fine showroom premises in the centre of the town which were inspected by the members at the conclusion of their tour of the works. Large display windows face on to a covered footway which provides shelter for those desirous of inspecting what is exhibited within.

Examples of all the latest gas appliances are tastefully set out in the commodious main showroom, which is given an additional brightness by the attractive light green floor covering, setting off to good effect the many pleasing coloured finishes of the appliances themselves. A comprehensive water heating section shows the various ways in which gas can meet this important domestic requirement, while another sideline of the Department is the enamelling of reconditioned black cookers, which are let out on reasonable hire terms whereby they eventually become the property of the consumer. Last year the Department's cash and credit sales for gas appliances and their fixing amounted to £9,500, a total of 205 cookers, 545 water heating appliances, and 650 other appliances being supplied on cash or hire-purchase terms, while 847 cookers and 104 wash-boilers were supplied on simple hire.

On the first floor is a splendid demonstration room with a fully-equipped platform for cookery lectures, &c. Many more interesting facts and figures relative to the Depart-

ment's activities and methods of charge were given by Mr. Davies in his Presidential Address.

Luncheon at the Station Hotel.

The Association were the guests of the Mayor and Corporation of Chesterfield at luncheon which followed at the Station Hotel—Alderman GEORGE CLARK, J.P. (Chairman of the Gas Committee), presiding over a large gathering, which included the Mayor of the Borough.

The Loyal Toast having been duly honoured, "The Town and Trade of Chesterfield" was submitted in cordial terms by Mr. R. S. RAMSDEN (Leamington), who observed how happy they were to be in Chesterfield that day as guests of the Corporation. There were many different industries in the town, some of which were household names among Gas Engineers; while it was also an important centre of coal production. Mr. Ramsden went on to congratulate the Mayor upon his occupancy of a position which went back as far as 1594, adding that the town was not content to rest upon its laurels, but was right up-to-date in every respect. In this connection he referred specially to the excellent housing policy which the Corporation were pursuing. He trusted that these houses would be fully equipped with all the latest gas appliances.

Mr. Ramsden went on to make an appeal to the coal interests of the neighbourhood in connection with the coal marketing scheme, remarking that the Gas Industry, which was compelled by law to maintain a supply, was experiencing considerable difficulties in purchasing coal to meet next winter's requirements. He asked that the district representatives of the collieries would do all they could to give the Gas Industry a fair deal.

In conclusion, Mr. Ramsden once again expressed the Association's pleasure in being at Chesterfield on that occasion to visit their gas-works and other undertakings, to partake of the Corporation's generous hospitality, and to pay tribute to their Mayor and to their Gas Engineer, Mr. Davies, whose valuable experience enabled him to carry out his duties in a manner which he hoped gave him as much pleasure as it did his fellow-members of the Association.

The toast was warmly accepted, and, in responding, HIS WORSHIP THE MAYOR OF CHESTERFIELD (Councillor G. F. Kirk) first extended a hearty welcome to the Association on behalf of the Corporation. He had personally derived a great deal of pleasure from being so frequently in contact with Mr. Davies in his management of their Gas Department. So far as Chesterfield was concerned, they had something to be proud of in their Gas Department. There was still in the Borough one of the original gas standards dated 1829, which must be among the earliest in the country; the town was one of the first to be lighted in this way.

During the past fifteen years, continued the Mayor, the adaptability of the Gas Industry had been put to a severe test in view of the changing conditions and growing competition. But gas undertakings generally, and that at Chesterfield in particular, had adapted themselves to meet those changing conditions in a remarkable way. In 1898 the output of gas at Chesterfield was 200 million cu.ft.; to-day it was 600 millions. Their Gas Engineer and Alderman Clark had done remarkably well in keeping pace with the growing demands of the town, with the result that although they had been faced with many difficulties, those difficulties had been opportunities—and they had been very successful in overcoming them. Finally Councillor Kirk said that they would always be pleased to see members of the Midland Association in Chesterfield, and he hoped they would find the visits they were to make during the afternoon of interest to them.

"The Association."

"The Midland Association" was proposed by Alderman CLARK, who informed the gathering at the outset that as he was not only a member of the Association but also a member of The Institution of Gas Engineers, he was really proposing his own health. The Gas Industry, he went on, was one of the most comprehensive organizations in the country—comprehensive because every branch was linked up from The Institution of Gas Engineers, through the other National Bodies, to the District Associations of which they were one. In proposing this toast, therefore, he might just as well be proposing a toast to all or any of the other Associations for the effective and efficient work they did. He knew of no other industry whose component parts were drawn so closely together as in the Gas Industry. The Chairman referred to the good work of the Birmingham Gas Department, which was one of the most progressive in the country; and they were delighted to have Mr. A. W. Smith with them on that occasion. Mr. Smith had made his name a household word in the Industry, and they congratulated him upon succeeding Sir Francis Goodenough as Chairman of the Executive Committee of the B.C.G.A. They were also pleased to have with them that day Mr. R. J. Rogers, who was the newly elected Chairman of another of the Industry's National Bodies—the S.B.G.I. He welcomed the members one and all to Chesterfield; and he welcomed them particularly because Mr. Davies was their President. Previously President of the Manchester District Association and also of the Association of Public Lighting Engineers, he was now President of their Association, and Alderman Clark wished him every success in that position. Mr. Davies had been Gas Engineer at Chesterfield since 1919, and Alderman Clark could well remember presiding at the meeting at which he was appointed; Mr. Davies had been very successful in this capacity.

In proposing this toast, Alderman Clark emphasized that their Association was only a section of a great Industry. The use of industrial gas was going forward by leaps and bounds; it was at the same time purifying the atmosphere; it was ready; it was clean, and great industries were using more and more as time went on. In addition to industrial purposes gas was also holding its own in the domestic field. When he was first associated with the Chesterfield Gas Department the output was 150 million cu.ft.; last year the figure had risen to 620 millions—which was some indication of the strides the Industry was making and the contribution it was offering to the welfare of the country as a whole. In proposing this toast he coupled with it the name of Mr. Harold Davies, their President.

Mr. DAVIES, who was cordially received, in the first place thanked the Mayor and members of the Gas Committee for their kindness in providing facilities for the visit to Chesterfield that day. This represented the opportunity given to members annually for inspecting their President's works, and he hoped they might have seen something to repay them for their visit that day. The Midland Association, went on the President, was formed in 1878, and he was reminded that Sir John Ferguson Bell, who joined them in 1884, was their oldest living member. He thought it would be appropriate if their Hon. Secretary wrote to Sir John expressing the good wishes of the Association.

Finally, Mr. Davies made a special appeal on behalf of The Institution of Gas Engineers' Benevolent Fund, remarking that there were only eleven members of the Midland Association who were not subscribers. He particularly asked that these eleven members would come into the scheme and help forward the great work that was being done.

Two Visits of Interest.

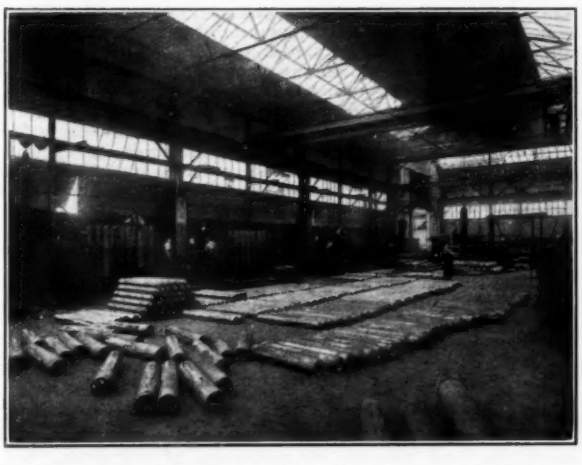
Luncheon over, the members embarked upon an afternoon of works visits of exceptional interest—first to see glass being made at the B.T.H. works and then tubes and cylinders at the Chesterfield Tube Company.

Many different types of glassware are turned out at the B.T.H. works, though the largest output is of glass for electric lamps and ordinary table tumblers. Much of the glass is still hand (or rather mouth) blown, though there are several robot blowers in the form of revolving machines of remarkable ingenuity, which lift the molten glass from the furnace or pot, pass it through the various processes of blowing and shaping without the touch of human hands and finally drop the lamp glasses off on to a moving belt which carries them away to the finishing processes and packing. At several stages in the process experts test the glassware for faults. In the case of the tumblers, glazing and smoothing the lips are additional processes.

Types of glassware from tiny motor-car sidelamp bulbs to enormous containers used in mercury arc rectifiers are made at the B.T.H. works. The mixing department was also inspected, where the various ingredients required to produce the molten glass are carefully weighed and mixed, while another interesting room was that in which the pots in which the raw materials are heated to their molten state are made. These are built up by hand of plastic clay and have to be "dried off" for at least nine months before they are put into commission; and such are the conditions under which they have to work that they rarely last more than two months under fire.

The Tube Works.

Passing on to the Chesterfield Tube Company, the Association were first shown the new shop which is at present



A View of one of the Shops at the Works of the Chesterfield Tube Company.

in course of construction. This will finally measure 660 ft. in length by 150 ft. wide and will be equipped with the latest type of machinery. The whole works covers an area of some 22 acres and has direct access to both L.M.S. and L.N.E. Railways. The principal products are cold drawn seamless steel tubes and cylinders for all kinds of compressed gases.

The tendency towards higher steam pressures has involved a considerable increase in the use of the firm's steel tubes, with a corresponding demand for their cold drawn specialities, and the modern plant seen at the works enables tubes up to 24 in. diameter to be turned out.

After preliminary heating, the billet is passed to huge hydraulic presses, some of which operate at over 1,000 tons pressure, and is forced into shape suitable for drawing out into the desired tubes. The billet is thereafter known as a "bloom" and is further rolled and drawn into its final shape. Much the same principle is followed in the production of high-pressure cylinders, and very careful tests are carried out to ensure complete safety up to pressures of several thousand lb. per sq.in. Interesting details of the various tests carried out on the cylinders used for gas-driven motor vehicles were given in the "JOURNAL" for Nov. 22, 1933, in connection with the inauguration of the compressed gas-filling station at the works.

Having viewed the different manufacturing processes and other departments, the visitors were entertained at tea by kind invitation of the Chesterfield Tube Company, to whom a hearty vote of thanks was accorded on the proposition of Mr. A. W. SMITH. In response, Mr. J. TREVARROW (Managing Director) expressed the firm's pleasure in having the Association with them on that occasion and the hope that they had seen something of interest.

Yorkshire Junior Gas Association

Short Paper Meeting

A meeting of the Yorkshire Junior Gas Association was held at Halifax on Saturday, May 22, when three short papers were presented. Extracts from two of these are published below; the other will be dealt with in a subsequent issue.

Aspects of Preheating in Dry Purification

By J. CASTLE, of Brighouse

The object of this Paper is to deal with a fairly recent development in dry purification—namely, the heating of the gas prior to its admission to the boxes. Of all the various processes occurring on a gas-works, strange to say, that of the dry purification of the gas for the removal of H_2S is the one over which least technical control is exercised. It so happens that hydrated ferric oxide removes the H_2S reasonably well at normal temperatures, and owing to the stringency of the law relating to H_2S in gas, purifiers are designed to have a very wide margin of safety, so that the gas invariably leaves this part of the plant in the required condition. Provided the gas is completely stripped of H_2S, that the back pressure thrown is not excessive, and that the oxide finally works up to a sulphur content at which the oxide buyers will buy, very little interest is taken in the purifiers. With efficient control, considerable economy on dry purification can be effected in many cases. In 1931, Clayton, Williams, and Avery presented a Paper to the Manchester District Institution of Gas Engineers, in which, among other things, the economy of working oxide up to a high sulphur content was pointed out. Three examples were given, in which it was shown that if an oxide is worked up to 40% S_2 and 10% H_2O, 2·015 tons of original oxide would be required to remove 1 ton of S_2; at 50% S_2, 1·29 tons of oxide; and at 60% S_2, 0·806 tons of oxide. In fresh oxide alone this represents a great economy when the oxide is worked up to a high sulphur content, while this is further enhanced by the higher price obtained per unit.

In common with most chemical reactions, several factors influence the efficiency of dry purification. It is common practice nowadays to revivify the oxide *in situ* by admitting a controlled quantity of oxygen to the gas stream, and it is important to note that revivification of oxide is a process very much slower than sulphiding. Under the most favourable conditions, revivification proceeds one-third as fast as sulphiding, a fact which makes the whole process dependent on the revivification reaction. Leaving this consideration on one side for a moment, the factors which chiefly influence the efficiency of removal of H_2S may be summarized as follows:

1. The time contact of the gas.
2. The extent to which the oxide is sulphided.
3. The acidity or alkalinity of the oxide.
4. The moisture content of the oxide and the humidity of the gas.
5. The temperature of the reactants.

Paramount Importance of Moisture.

Briefly, (1) is taken care of in the design; (2) is responsible for backpressure; while, concerning (3), the oxide should be kept alkaline by admission of 4-5 grains NH_3 per 100 cu.ft of gas.

The moisture content is of paramount importance, since it acts as the medium through which the H_2S reacts with the oxide. Several workers have shown that dehydration of ferric oxide with conservation of its activity is impossible. Finally we have the question of the temperature at which the reactions proceed most favourably.

Very little work has been done on the reactivity of oxide at various temperatures, but from the information available it appears as if temperature alone has little effect on the reactivity above a temperature of 70° F., although it is generally conceded, particularly in America, that best results are obtained with the gas at a temperature of 85° F. to 105° F. Theoretically, this small effect of temperature above a certain limit can be explained as follows. First, both sulphiding and revivification reactions are exothermic, and favour rapid removal of any heat liberated. Secondly, the chemical reaction proceeds favourably when warm; and, thirdly, the solubility of the H_2S in the moisture is reduced by increasing temperature. These three variables evidently balance over a range of temperature of 70° F. to 105° F., and balance most favourably between 85° F. and 105° F.

Consider now the moisture content of the oxide. It is not possible to give the best figure for the moisture content, since this varies greatly between various oxides. The optimum condition is one in which each particle of oxide is just covered with a thin layer of moisture. Under these conditions the oxide particles are swollen so that the interstices between the particles are largest, thereby causing the box to throw only a small back pressure. Less moisture causes the particles to shrink, resulting in smaller passages for gas passage, while more moisture clogs the small gas passages up, and in each case the back-pressure thrown by the box rises. With correct moisture content the area of wetted surface is at a maximum, and also the thickness of the moisture layer is such that diffusion of H_2S through it is fairly rapid. A higher moisture content deepens this layer of water, thus retarding the diffusion of H_2S, so that the efficiency of extraction falls off. A fall in the efficiency of extraction of H_2S due to excessive moisture is also indicated when the Law of Mass Action is applied.

A representative formula for sulphiding is:

$$2Fe_4O_3 \cdot 3H_2O + 6H_2S = 2Fe_2S_3 + 12H_2O \quad . \quad . \quad . \quad . \quad . \quad (1)$$

the corresponding revivification formula being:

$$2Fe_2S_3 + 3O_2 + 6H_2O = 2Fe_4O_3 \cdot 3H_2O + 3S_2 \quad . \quad . \quad . \quad (2)$$

Consideration of these two formulæ shows that during sulphiding moisture is evolved and must therefore be removed, while moisture is taken up during revivification and must therefore be supplied.

It is at this point that temperature control as a means of controlling the humidity of the gas and hence the moisture content of the oxide assumes considerable importance. By varying the temperature of the gas it is possible to so vary the quantity of moisture carried by a given volume of gas that water can either be removed from or deposited in a particular mass of oxide. Consider the sulphiding reaction (Eq. 1). This should be almost completed in the first taker, so that a knowledge of the

H_2S removed automaticallly provides a knowledge of the water released. If the oxide has a correct moisture content prior to admission of the gas it will be necessary to remove this extra moisture. Recent experiments at Brighouse Corporation Gas-Works showed the gas to leave a box saturated with water vapour irrespective of the saturation of the incoming gas. Therefore, with a knowledge of the H_2S removed and the temperature of the outgoing gas, it is only necessary to vary the temperature and saturation of the incoming gas in order to maintain the correct moisture content of the oxide.

Removing Excess Moisture.

In 1930 Milbourne and Huff, of America, published a Paper in which it was shown on an experimental scale, with a gas temperature of 100° F, that the best H_2S removal occurred when the humidity of the incoming gas was 65%. Several explanations were advanced, but if we consider an H_2S removal of, say, 500 grains per 100 cu.ft., and allow the gas to leave at 100° F., then the water released by the sulphiding reaction would be sufficient to raise the humidity of the gas to 92% saturation. This would appear to bear out the desirability of removing any excess moisture formed.

A consideration of the revivification formula illustrates the necessity for deposition of water in the box. If in a set of four boxes the first removes most of the H_2S, then the three other boxes can readily be worked at the best condition for revivification by the usual admission of oxygen, and also by saturating the entering gas to the second box at such a temperature that when the gas leaves this box sufficient water will have been deposited to satisfy the requirements of the reaction. The temperature and saturation of the gas entering the last two boxes should be such that the moisture content of the oxide remains unaltered.

According to Milbourne and Huff, the best conditions for revivification are obtained when the gas is saturated, although they suggest that in practice a slightly lower saturation might be preferred in order to avoid deposition of water.

It would appear that if this were practised then the oxide would become too dry and lose its activity long before it was fully sulphided. However, their experiments show conclusively, that a high humidity is essential, and one example will suffice to illustrate this point. Using a sulphided oxide containing 16·8% moisture, they found that if air alone were used at a temperature of 38° C. the oxide was revivified in approximately one-quarter hour when the air was 100% saturated, while at 20% humidity the oxide was only partially revivified after 5,780 hours, and at 10% humidity no revivification had occurred after 12 months. This forcibly illustrates the need for controlling the humidity of the gas during revivification.

If the gas is preheated without humidity control, then the ultimate result is a dry inactive oxide. This inactivity is due largely to the fact that water acts as the medium between the gas and the oxide, and its absence reduces the rate of reaction between the oxide and the H_2S or oxygen enormously. Under normal conditions hydrocyanic acid is absorbed as "blue"—*i.e.*, ferrocyanides—thereby considerably enhancing the value of the spent oxide. If the oxide is too dry, sulphocyanides are formed instead, these being of a corrosive nature and highly objectionable. Further, a warm dry oxide is favourable to the formation of ferrous salts, which coat the particles of oxide, thereby considerably reducing the activity of the oxide mass. Once this acidity has taken hold, it is impossible to revivify the oxide in the boxes.

Holmes' System.

The system of temperature and humidity control which I propose to describe is manufactured by Messrs. W. C. Holmes & Co., Ltd., and consists of a separate preheater for each box, being situated somewhere in the inlet gas main. The outer casing through which the gas passes is fitted into the pipe line and contains a block of radiant heaters, through which passes live steam. The steam trap is designed to work against a pressure head, and the condensed water is made to flow over the outer surface of the radiants. By this means it is possible to preheat the gas and saturate it at a given temperature, the conditions being varied for the different boxes. This method of separate conditions for each box is the only method which permits of speeding up the revivification of the oxide—the vital process in the successful working of the H_2S removal system. A single preheater situated immediately prior to the boxes permits of no control beyond that of the first taker, all the heat being dissipated before the second box, and at a point where the reaction frequently proceeds fast enough to keep the oxide mass at a good working temperature without any external aid.

The preheaters at the Brighouse Gas-Works are of the type just described, except that there is no provision for re-circulating the condensed water over the radiants. Humidity is controlled by the admission of a controlled quantity of wet steam into the preheated gas. In the experiments conducted at this works, it was desired to test the effect of humidity control under working conditions, and to this end work was done on a box immediately after it had become first taker. In the first place the effect of merely preheating the gas was noted. For the first 4 hours the efficiency of extraction of the H_2S was 87%. The gas saturated at 51° F. was preheated to 108° F. and left the box saturated at 84° F., thereby removing from the box more moisture than was being released by the sulphiding reaction. These conditions were maintained, and after the fourth hour the efficiency of H_2S removal began to fall off rapidly, finally becoming steady again at 65%. The interesting part about this is that, while the moisture content of the oxide was reasonably correct, a good efficiency of H_2S removal was obtained; while a reduction in the moisture content of the oxide brought about a reduction in the efficiency of H_2S removal, as had been anticipated.

The next part of the experiment was to see whether the efficiency could be recovered again by replacement of the lost moisture. Accordingly wet steam was admitted to the preheated gas so that the gas entered the boxes saturated at 104° F., and left saturated at 85° F. The amount of moisture removed after the efficiency of H_2S removal had fallen from 87% up to the time of admitting moisture was noted, and from the available data it was possible to calculate the amount of gas to be passed before the oxide regained its original moisture content. Tests on the H_2S removal were carried out during this time, and showed no improvement until the calculated quantity of gas had passed. This marked the start of a fairly rapid increase in efficiency up to 80%, at which point it was necessary to cease testing. Incidentally the humidity of the gas had been cut down to a figure calculated just to remove the water released by the reaction and no more, from the time when the required quantity of wet gas had passed through the box. There seemed little doubt that had it been possible to carry on testing the gas a still further improvement in efficiency would have been shown, although perhaps not up to the original figure of 87%.

Vital Necessity of Moisture Control.

However, the test was sufficient to show the vital necessity for moisture control, and illustrated the bad effect of merely preheating the gas, regardless of its humidity. One noticeable feature of this test, which lasted for two days, was the constancy of the outlet temperature at 84° F., irrespective of considerable variations in the temperature and volume of the incoming gas, suggesting that this is the most favourable temperature for the reaction in this case.

It has not been possible to test the effect of controlling the humidity of the gas so that the moisture content remains constant during either sulphiding or revivification, since only a very long series of comparative tests is likely to illustrate the effect of humidity control. Such tests would have to follow the working life of a batch of oxide from being first put to use until it was finally sulphided. From a theoretical aspect, however, it seems obvious that such control would have very beneficial results and be attended with considerable economy in working, and the test already described indicates that some control is necessary, and that drying of the oxide seriously reduces its efficiency during the sulphiding period.

Preheating then resolves itself into an effective method of controlling moisture conditions within the purifiers by means of controlling the humidity of the gas. This is achieved in practice by supplying gas to the purifiers at such a temperature and humidity that moisture is removed or supplied in quantities dependent on the reactions taking place within the boxes, the necessary control being effected prior to each box with apparatus such as that already described.

Credit for the original investigations which led to the development of this apparatus is due to Pott and Broche, of Germany, while various investigators have since worked on this line.

In conclusion, I wish to express my best thanks to Mr. J. Corrigan, M.Inst.Gas E., Engineer and Manager of the Borough of Brighouse Gas Department, and to Messrs. W. C. Holmes & Co., Ltd., for providing facilities for the practical work to be done, and permission to include the results in this Paper.

[*A further Paper follows on the next page.*]

The Domestic Coke Load

By C. J. DOUGHERTY, of Leeds

The ideal coke market is one which follows the gas load, thus avoiding depreciation of coke due to stocking and the subsequent labour cost of storage and necessary re-grading. In practice the industrial coke load keeps apace with the gas load and may, therefore, for the purposes of this Paper, be neglected.

In my opinion the domestic load, which may be divided into two main classes—namely, direct heating with coke grates, and indirect by central heating—varies directly as the climatic conditions obtaining on a particular day. Thus, in estimating coke sales for a given period, there is always a wide discrepancy due to non-seasonal weather such as, to stretch a point, a fortnight of snow in August or sunbatning in January. It is inevitable, therefore, that a surplus stock of coke should accumulate during the summer to meet an increased winter load from the domestic consumer, and it is important that the engineer should deal with this load in an efficient and remunerative method. Coke for domestic purposes must be looked upon to-day as a refined product and as such command the highest market value.

It is essential that everyone engaged in the sale of coke should be *au fait* with its properties. Coke has a lower calorific value than coal. A dense ash is to be preferred to a light one, as a light ash soon makes a fire sluggish; a heavy one falls away and leaves the fire comparatively clean. Coke from vertical retorts will have a larger ash content than it would have were a similar coal carbonized in a horizontal setting. This is due to the steaming in verticals, which reacts with a certain amount of carbon, forming blue water gas. Coke from verticals, however, is practically dry cooled, and this, in my opinion, is a great advantage. Coke for sale must have a low moisture content to maintain its thermal efficiency, and therefore coke from inclined or horizontal retorts should also be dry cooled. Some people affirm that a percentage of moisture up to even 30% does not affect the rate of combustion, but I think that it must be obvious, even if this is so, that the moisture present can only be evaporated at the expense of the thermal efficiency of the fuel, and this is highly undesirable. As far as I can understand, the only advantage gained is due to the increased weight sold. Wet quenching is productive of more breeze and dust than dry cooling, owing to the shock effect of the cold water splitting up the hot coke, besides raising the moisture content very considerably. In dry cooling methods, inert gases pass through the hot fuel and then through steam boilers, thus transferring the sensible heat from the coke to the water in the boiler.

Incidentally, Mr. B. Thorpe, of Huddersfield, in a Paper given in 1933, says that if waste gases are used for drying coke, there is a marked decrease in the sulphur content, the iron phosphates and sulphates being driven off. Dry cooled coke is free from fliers when burnt. We carried out tests in the Leeds Meadow Lane Laboratory some years ago and proved that the sudden contraction due to wet quenching results in stresses and strains being set up in its structure and pieces fly off when burnt in an open grate, and, besides being noisy, this is a possible danger to carpets and furniture. Dry cooling entirely obviates the danger of heavy fliers in the coke.

An average analysis of a suitable domestic coke would give: 85% fixed carbon; 1-2% volatile matter; 4-5% moisture; and 6-8% ash—the calorific value being approximately 12,500 B.Th.U. per lb.

A coke buyer is purchasing heat—ash and moisture are worthless to him. It must be remembered that coke with a light ash content will have a greater affinity for water. The density of coke must also be taken into consideration. Coke fires are more easily lit if the partially burnt coke from a previous fire is mixed with the fresh fuel. This is due to the light cellular structure of the coke which is partially burnt, and it ignites at lower temperatures than the low bulk density coke.

Gas undertakings should not supply coke on demand unless they know for what purpose the coke is to be used. Having ascertained this, they should advise the customer as to the particular grade best suited for him. This should increase both sales and the number of satisfied customers. Grading is very important; and here are the sizes applicable to their particular use in the market.

Large Coke, rejected by a 2½ in. screen, is in special demand for central heating, and steam boiler furnaces with large capacities.

Domestic Coke, graded between 2½ in. and ⅜ in., is suitable for open fire grates, for steam raising with smaller central heating boilers, and also for the larger hot water supply boilers.

Coke Nuts, passing through ⅝ in. but rejected by ⅜ in., are used for closed stoves, small hot water supply boilers, kitchen ranges, for mechanical stoking and for smithies' forges.

Coke Breeze, passing ⅜ in., is suitable only for boiler firing with either forced draught or special fire bars.

Some years ago the largest coke was looked upon as the best coke and commanded the highest price, and it is interesting to note that during the last few years the demand for smaller sized coke—*i.e.*, below 2½ in.—is replacing it. It seems that no modern coke grading plant is complete without a highly efficient cutting plant, particularly where horizontal coke is made. It is a very good idea to put up a small show case, either in the showrooms or at the entrance to the works, showing the different grades of coke and their prices.

The ordinary coke grate should be installed in as many public places as possible, such as public houses, libraries, surgeries, cafés, &c., where people foregather. If a consumer is made to install suitable grates, he will lower the cost of the heat unit owing to the higher effective thermal efficiency of the fuel. Moreover, the appliance, if incorporating a gas poker for lighting purposes, will minimize the maintenance necessary. Incidentally, the additional use of a gas poker, if it became standard practice in a city the size of Leeds, would increase the daily load by at least 500,000 cu.ft., a not inconsiderable figure.

With regard to central heating, architects must be educated to the fact that modern methods by means of coke-fired boilers are by far the most economical. Comparisons should be put before them showing the superiority of coke heating over other methods and their interest and practical help gained by these means. It should be easy to arouse their enthusiasm in smokeless houses and to ensure that they make adequate arrangements for coke grates and boilers. The arrangement of the necessary bunkerage for different grades of fuel would then be a necessity, and not as at the present time, owing to the lack of space, a nuisance.

The gravity-feed boiler is the most popular appliance at the moment for central heating. A container of from 8 to 24 hours' capacity feeds the fire by gravity according to the rate at which the coke is burnt away, there being no moving parts. This means that the boiler needs attendance only once or twice a day to clear away the ashes and refill the container.

On the Continent, central heating is much more predominant than in England; and in Copenhagen I believe the Gas Department were among the first to evolve a scheme whereby large blocks of flats are heated by coke boilers at contract terms under the Department's own management and maintenance. By this I mean a suitable appliance, generally a gravity-fed coke boiler, is installed and a man is detailed by the Department to look after the heating of this block and of several other buildings also. He has to replenish the fuel, clear the ashes away, and see that the thermostats and water supply are working efficiently. This system has a great advantage in that the Gas Department can supply exactly the right grade of coke to suit the boiler, thus maintaining very efficient results. I believe that this system has recently been inaugurated in England.

When considering the sale of coke to domestic consumers, I venture to suggest that the following points are essential:

The size of coke suitable for particular appliances.
The coke must not "spit" or "fly."
Must be relatively easily ignitable.
Have a low ash content and not be dusty.
The ash must be dense.
It must have a low moisture content and a bright appearance.
Should be delivered in any desired quantities.
Suitable accommodation, such as portable bins, to be supplied where necessary.
Orders for 2 quarters or less should be supplied in paper bags.
Suitable grates must be employed with suitable bricks to raise or lower their capacity, as required.
Gas pokers to be installed wherever there is a coke grate.

One shudders to think of the problem which would confront the Gas Industry were smoke abatement compulsory and the solid fuel fire still in favour. Imagine a City like Leeds, consisting of approximately 150,000 houses, each consuming 5 tons of coke per annum. The domestic coke requirements would be in the region of 750,000 tons per annum, entailing a carbonization of 1,500,000 tons of coal. Comparing this with previous years, in the event of the Gas Department supplying all this fuel and neglecting entirely the industrial load, I find that the carbonizing plant would have to be increased by at least 16 times.

The Gas Industry is fortunate, however, in having access to a gaseous *and* solid fuel market, thus being in a position to balance the sales to better advantage.

Imperial Continental Gas Association

The One Hundred and Eighty-Ninth Ordinary General Meeting of the Proprietors of the Imperial Continental Gas Association was held on Friday, May 28, 1937, at Winchester House, Old Broad Street, London, E.C. Sir THOMAS ROYDEN, Bart., C.H. (Chairman of the Board), presided.

The SECRETARY (Mr. W. E. Bowers) read the notice convening the meeting, and the Auditors' Certificate on the Accounts.

With the consent of the meeting, the Report of the Directors and the Audited Statement of Accounts for the year ended March 31, 1937, as printed and submitted, were taken as read.

The CHAIRMAN, presenting the Report and Accounts and moving their adoption, said:

Ladies and Gentlemen,—

The Report and Accounts have been in your hands for some time. May I take it that, in accordance with our usual practice, they be taken as read? [Agreed.]

I have to record with very deep regret the loss of our colleague, Sir Henry Birchenough, who died a few days ago. Sir Henry joined the Board of the Association in the year 1899. He was elected Deputy-Chairman in 1928 and Chairman in 1931. He resigned the Chair in 1934, but remained on the Board up to the end of his life. During the thirty-eight years of his connection with the Association he rendered much valuable service. Both at home and on the Continent he gave ungrudgingly of his time to the work of the Association, and his wide experience of affairs and mature judgment combined to make him a great asset at our Councils. In him the Board has lost a valued colleague and a true friend.

The past year has been for us one of considerable anxiety. The situation in France has caused, and still is causing a feeling of uncertainty, and, indeed, of some apprehension. Man is a creature of infinite adaptability. Given sufficient time, he can accustom himself to almost any change, whether it be of environment or climate or economics; but, unless the changes come reasonably slowly, his reactions, mental or physical, are apt to be violent and their consequences unfortunate and even disastrous. Events have proved that the alterations in industrial life in France have been too rapid to escape the inevitable consequences of forcing the pace. There has been much confusion, much dislocation in the industrial machine, and a widespread loss of confidence which is fatal to prosperity. Some of the social and economic changes which have taken place were undoubtedly overdue, and, had they been effected less precipitately and with more forethought, the country would have been able to avoid many of the difficulties which now beset it. Patience and a better understanding on the part of the employer and employee of each other's point of view will eventually provide a stable basis on which a new and more prosperous state of affairs can be built.

As an example of the revolution which has taken place in industry, I would cite the question of hours and wages. From one of six days, the working week has been reduced to one of five. Adding to this the annual paid holidays recently granted —ten in all—the number of working days in the year has been reduced by 54, so that the working year in France is now one of 251 days, as against 305 days formerly. For this shorter working year, a wage more than 30% higher is being paid. Naturally costs of everything have risen, and in the present transitional stage France hesitates to allow the operation of the usual corrective, namely, that of reducing import dues, or even of permitting unrestricted imports from other countries. It would seem, therefore, that, unless world prices adapt themselves to the higher French price level, France will some day have to make her choice between either a further devaluation of the Franc or a system of rigorously closed economy.

The subject must be left upon a note of hope, rather than of optimism, for France has still a difficult road to travel, but I have great confidence in the sound common sense of the average Frenchman and his innate respect for the rights of private property. We can only hope that the present period of industrial unrest will soon pass and prosperity return.

While the Compagnie Continentale will naturally have to bear the extra burdens which have been placed upon French employers, there is reason to expect that the resultant higher standard of living of the working classes will have a favourable effect upon the amount of gas and electricity which they consume, although this has not become apparent yet.

"Stay-in" strikes led to a reduction of the industrial consumption of electricity and gas, and imposed on the average domestic consumer the necessity for economy. Nevertheless, the sales of gas during 1936 as compared with 1935 showed only a slight decrease, approximately three-quarters per cent., whilst sales of electricity increased by 3%.

These standards of output would normally have led to a small increase of profit, but actually trading profits were down by some Frs. 4,700,000, because, while the price per unit of gas and electricity sold was lower, expenses owing to the wage increases, granted since the present French Government took office, were higher.

There is a considerable interval of time, sometimes as much as a year, before prices of gas and electricity in France can be adjusted to costs of production. This means that in a period of deflation prices fall less rapidly than costs, while in a period of inflation prices always lag behind them. The increased costs in 1936 will be reflected in the increased prices chargeable in 1937; but complete compensation will not be obtained until the upward movement of costs has ceased and stability is attained. To give an illustration, the price of gas in Lille is now 72 centimes, as compared with 66 centimes in 1936, but in 1937 the extra costs arising from the introduction of the forty-hour week and the higher wages will have to be borne, whereas prices to cover these will not be raised until 1938.

Apart from the less favourable trading conditions in 1936, the value of certain of the investments of the Compagnie Continentale fell below their book values, and the Board of that Company thought it wise to make provision for this shrinkage out of the profits of the year instead of following the more usual practice of providing for it out of reserves. Nevertheless, with the help of an appropriation from Reserves of only Frs. 2,034,000, the Company was able, after making adequate provision for amortization, to maintain the same rate of dividend, involving a disbursement of Frs. 24,400,000.

The devaluation of the Franc took place at the end of September, 1936, and the result of this step was that whereas on April 1, 1936—the first day of our financial year—the Franc stood at 75·11 to the £, on the closing date it stood at Frs. 106·33. It is not, however, our practice to take any avoidable risk on the rates of exchange which may be ruling on the various dates on which our dividends from abroad are due for remittance to this country, but to obtain exchange cover over the period during which our dividend here is being built up. As a consequence of this policy, the rate at which we were able to bring our French income into account averaged Frs. 79·31 to the £.

The dividends we have received from the Continentale in the year under review amounted to £212,430, as against £197,897 in 1935. This difference is due to the fact that last year there was a readjustment in the method of tax collection, the effect of which was to bring two tax collections into one year. At the present rates of dividend and exchange, our investment would produce an annual income of approximately £150,000.

In the Accounts before you, there are included the final dividend of the Compagnie Continentale du Gaz for the year ended Dec. 31, 1935, and the interim dividend for the year 1936. The final dividend for the year 1936, for which exchange provision has also been made, will be brought into our next accounts, so that the full measure of the devaluation of the French Franc will only make itself felt in the accounts which will be presented to you in May, 1939. It is to be hoped that by then such a trade recovery will have taken place in France as will suffice to counterbalance the cut in the rate which governs the conversion of our French dividends into sterling.

There has been in France a wide-spread fall in the market value of public utility shares. For the first time the market value of our holding in the Compagnie Continentale is now below the figure at which it stands in our books, but there are substantial surpluses on our other investments which more than cover this difference. No special steps, therefore, to write it down have been necessary. Having regard to the value of the capital assets of the Company and to the basis of world values for public utility properties of a corresponding size and character, this investment, given a reasonably stable political background, should in due course stand far above its present market valuation.

In contrast with the state of affairs in France, the situation in Belgium is most encouraging. Trading profits have increased throughout the country, and the number of unemployed has fallen very considerably. The index of industrial production rose from 92·6 in March, 1935, to 119·8 in December, 1936. This is by reference to the basic index of 100 which covered the very prosperous period 1923-1925 when trade was receiving a special stimulus owing to the work of post-war reconstruction. This industrial prosperity is all the more remarkable in that Belgium, unlike this country, is not undertaking any extensive scheme of rearmament, although naturally her heavy industries are benefiting from the rearmament programmes of other European Powers.

Receipts in that country from taxation have increased considerably; tax reductions have been effected, and the credit of the Belgian State accordingly stands at an exceptionally high level. For example, the Government has been able recently to issue Three Months' Treasury Bills at under ½% per annum, the issue being over-subscribed eight times.

This general improvement has been reflected in the progress of the gas and electrical industries.

The Reports of the Belgian Companies in which we are interested show that they have shared in the general prosperity. The increase in the quantities of gas sold by them varies from

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1·6% to 9·85%, and in the case of electricity from 7·31% to 15·4%.

For gas the increases are well up to the world standard, while for electricity, in view of the very considerable extent to which Belgium has already been electrified, they represent no inconsiderable achievement. It is interesting to observe that if the figures for the output of electricity in 1936 are compared with those of 1929, Great Britain shows an increase of 95%, Belgium 27·8%, and France only 12·5%.

In explanation of the difference between the Belgian and British figures, it is probably correct to say that in 1929 electrification had made considerably more progress in Belgium than in this country, and there was consequently less room for subsequent increase. To-day Belgium has a population of 8,300,000, and the number of low-tension electricity meters is 1,780,000. As the average population per household is 3¾ inhabitants, the conclusion is that 80% of the total number of houses in Belgium are equipped for the use of electricity. Of the remaining 20%, it is estimated that 5% of the houses are not within working distance of the existing supply cables, so that only 15% of the total householders, to whom a supply would be readily available, have failed to realize the advantages of the many uses of electricity in the home. Although, from the Supply Companies' point of view, to connect a large part of the poorer class of household is not a paying proposition, every form of price tariff is offered in order to meet the varying needs of the consumers, for the Companies realize that as they hold a public monopoly, it is their duty to give efficient service to all who require it.

If these small consumers are not a paying proposition for electrical service alone, how much less can they be so where it is necessary to supply them with the two services of gas and electricity. In some of the areas where our Companies provide both gas and electricity, there are some consumers who prefer an all-electric service, some who prefer an all-gas service, and some who prefer a combination of both. It is proper and right that customers should have the chance of having either, or both, if there is room for them, the one being ancillary to the other. Moreover, if electricity, in addition to supplying lighting and power, had to carry the whole of the cooking and heating loads as well, the capital expenditure on the necessary plant would attain astronomical proportions, for, until a system of electrical storage is invented which is both efficient and economical, the Electrical Industry must be equipped with generating plant which of itself is capable of meeting at any given moment the peak demand.

This, however, is not the whole of the argument. Regard must be had to the varying purposes to which gas and electricity are applied and their respective efficiencies in application. Under conditions of fair competition, by which I reject the idea of either subsidized gas or subsidized electricity, the two industries can be safely entrusted to find their level, but the uses of electricity are so manifold that for many years to come the rate of development in the demand for electricity will be far in excess of anything that can be attained by the Gas Industry.

To turn to the details of our Belgian interests, among the striking features, apart from the progressive increase in consumption of gas and electricity, is the arrangement which the Provinciale Company, following the example of the Antwerp Gas Company and Electrogaz, has made with the Communes which it serves. This takes the form of companies owned in partnership by our Companies and the Communes. These arrangements are working to the complete satisfaction of all parties. The Communes participate in the administration of the undertaking and share on an agreed basis in the profits made, thus learning by actual experience to appreciate the difficulties with which the Companies, as suppliers, have to contend.

In some cases these intercommunal arrangements were concluded before the devaluation of the Belga. They contained clauses which enabled the Companies, in the event of currency changes, to revalorize on a gold basis the capital employed, but as the cost of living has not risen to the full extent of the devaluation, the Companies have agreed to adopt as the standard of adjustment, instead of the full gold prices, the retail and wholesale index figures, a solution which may be considered satisfactory to all concerned.

The other matter in Belgium which calls for comment is the arrangement which has been made for leasing to a Group of Coal Mines for a period of five years at a fixed rent *plus* a share in the profits, the important coke oven plant at Pont-Brûlé belonging to the Cokeries du Brabant.

In view of the great shortage of metallurgical coke which prevails at the present time one would expect that now, if ever, a coke-oven plant should be making a profit. The price of coking coal has, however, risen even more rapidly than the price of coke, and the Cokeries du Brabant are fortunate in having been able to conclude this arrangement, which has enabled them to resume dividend payments at a time when other Belgian coke-oven undertakings, similarly situated, are still operating at a loss.

The capital of the Cokeries du Brabant has been written down to a very reasonable figure, but the Company is continuing the policy of applying substantial sums to the further depreciation of this particular asset.

When we last met, I drew attention to the fact that our Liquid Assets had an actual value of £2,292,000, and mentioned that we were watching for suitable opportunities of employing them. As practically the whole of our trading activity was concentrated in Belgium and France, we were anxious to increase the territorial spread of our undertakings and, if possible, to acquire a suitable public utility interest in this country. We were also of opinion that such a broadening of our basis ought to take the form of an investment in electricity rather than in gas.

In July last, an opportunity presented itself of acquiring a holding in Edmundsons Electricity Corporation. The controlling interest of that Corporation, amounting to 2,747,025 shares, was then in American hands. This block of shares was purchased by a British Group, and of these shares the Association took 1,000,000. Independently of this, we had already acquired 30,000 shares, so that the Association now holds 28% of the Ordinary Share Capital of Edmundsons, while a further 3% was taken by Companies in which the Association is directly interested.

The Corporation controls, directly or indirectly, a number of electricity supply undertakings in this country operating over an area of approximately 15,000 square miles with a population of over 4,250,000. Among these undertakings the principal are: The Shropshire, Worcestershire and Staffordshire Electric Power Company; The South Wales Electric Power Company; The East Anglian Electric Supply Company, Ltd.; the Cornwall Power Company, Ltd.; the Wessex Electricity Company; and the Bedfordshire, Cambridgeshire and Huntingdonshire Electricity Company. In addition to which it serves the Isle of Wight and a number of isolated towns.

In the rural areas much development work still remains to be done, and, given immunity from political interference, the Corporation should have a progressive profit-earning record, for certain of its Subsidiaries have either not yet started to earn distributable profits or have only just reached that stage.

The only revenue brought into the Accounts before you from Edmundsons is an Interim Dividend of 4%. This year the total Revenue from Home Sources is £62,200, as compared with £49,000 for the previous year, and next year, assuming the maintenance of the Edmundson dividend at the present rate of 9%, this figure should rise to £102,000. This should go far to make good any reduction in our income due to the devaluation of the French Franc.

At the rates of exchange ruling to-day, our future revenue will then be derived as to 60% from Belgium, 24% from France, and 16% from England. The corresponding figures last year were 58% from Belgium, 34% from France, and 8% from England.

The geographical division of our Investments and other assets —based on their book values—is Belgium 49%, France 29%, and England 22%.

It is a matter of regret to your Board that we are not in a position to give you this information in the more comprehensive form of a Consolidated Balance Sheet and Profit and Loss Account. The preparation of an accurate statement of this kind is, however, in the case of a Company such as ours, beset by many difficulties. We are, for instance, unable to establish a uniform financial year for our Subsidiaries and Sub-Subsidiaries owing to a number of restrictions imposed by foreign company law, which in some respects is definitely more exacting than the law in this country. As a result of this, a number of our Sub-Subsidiaries close their accounts as early as Oct. 31. Again, where a company such as the Compagnie Continentale du Gaz closes its accounts at the normal date, Dec. 31, it has not yet been found practicable, owing to the provision of French company law, to hold the meeting for the declaration of the final dividend until towards the end of May, which is too late for its inclusion in the Accounts of this Association for the corresponding year. Further, with the violent movements which have taken place in the rates of exchange in recent years, it is impossible to determine the appropriate rates which should be taken in order to arrive at, for the permanent Assets, Reserves and Profits of our Group, sterling values which reflect the real situation with any degree of accuracy.

If you will now turn to the Accounts in your hands, I will explain briefly the character of the various changes which have taken place as compared with last year.

The first item, Fixed Assets, shows an increase of £10,000, which represents the purchase price of buildings which we have secured to provide additional office accommodation in Brussels and London.

Investments and Subsidiary and Allied Companies show an increase of £1,870,000. This is chiefly due to the investment which we have made in Edmundsons Electricity Corporation.

Advances show an increase of £110,000. This is a balance figure, and is the result of the reclassification of an item which had previously been carried as an investment. Actually Advances have decreased by £247,000. Moreover, since the date of our Balance-Sheet, one of our Belgian Companies has repaid £200,000, and the item of Advances has undergone an equivalent reduction. The cash so received has been utilized to repay loans from Bankers amounting to £155,000, and at the moment our cash position is in credit.

General Investments and Cash show a joint decrease of £1,810,000, the amount having been utilized to finance our purchase of shares in Edmundsons Electricity Corporation. The market value of the remaining General Investments at the date of the Balance-Sheet showed a surplus over book value of £54,000.

Loan Capital again shows a slight reduction owing to purchases of our Debenture Stock in the market for purposes of cancellation.

Amounts owing to Subsidiary and Allied Companies are less by £88,000. We act as bankers to the various Companies of our Group, and day-to-day variations take place in the amounts which they have on deposit with us or which we have advanced to them. Deducting the amounts owing to our Companies from

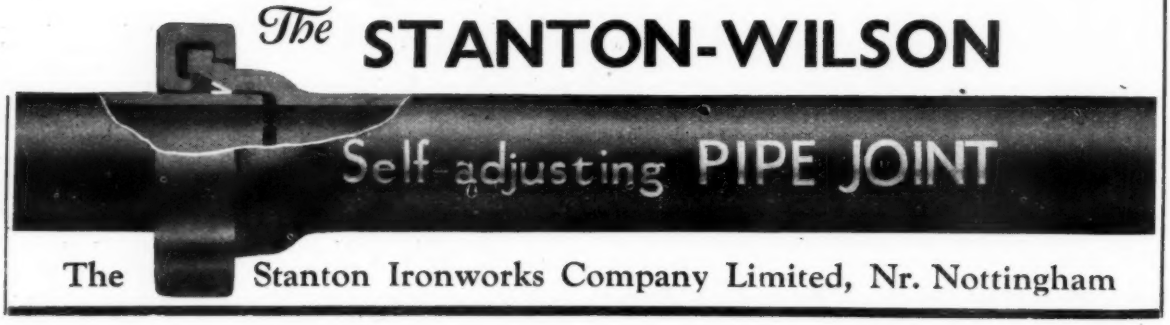
Traffic Vibration

Rigid or Self-adjusting Joints?

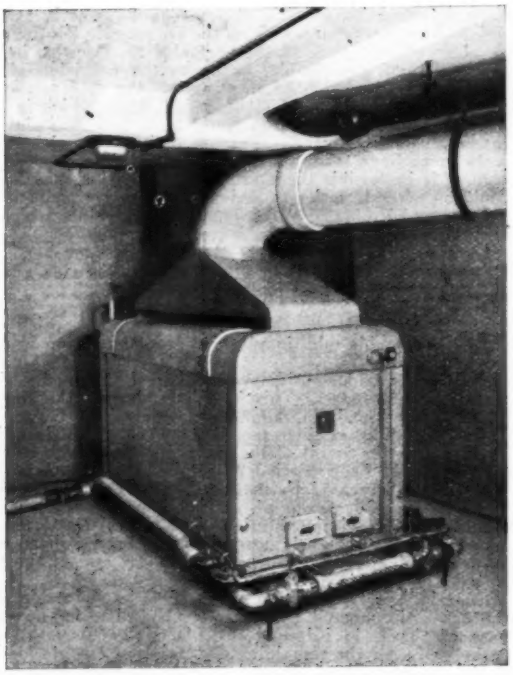
Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.



The Stanton Ironworks Company Limited, Nr. Nottingham



Swimming Pool Heating

A No. 3 Series "REX" Gas-Fired Heater of eight sections (output 750,000 B.Th.U. hourly) warming a Swimming Pool.

High Efficiency.
Low Maintenance Cost.

THOMAS POTTERTON (Heating Engineers) LTD.
Ravenswood Road, Balham, London, S.W. 12
Telephone: Balham 1244-5-6. Telegrams: "Potterton Toot, London"

the advances which we have made to them, the Companies on balance owe the Association the sum of £820,000, which, for the reason I have just mentioned, has since been reduced to approximately £620,000.

Sundry Creditors and Provisions is composed principally of our Pension and Taxation Reserves. The increase of £24,000 is accounted for chiefly by an increase in the Income-Tax Equalization Reserve.

General and Specific Reserves show an increase of £90,000. This is almost entirely the profit made on the realization of our General Investments.

Having regard to the value of the total volume of our assets, the situation of the Company is remarkably sound.

Turning to the Profit and Loss Account, you will see that our total income for the year was £599,900, as compared with £607,000 last year, a reduction of £7,000.

You will have gathered from my remarks that our Sterling income from French and English sources in 1936 was higher than in 1935 and that our Belgian undertakings have had a more successful year. In these circumstances the reduction of £7,000 in our income seems to call for explanation. Actually there has been brought into account for this year £34,600 less from Belgian sources. For one thing, the Accounts before you did not have the benefit of the Exchange Profit of £60,000, which made our previous year's effective remittance rate Frs. 120 to the £, against the current rate of Frs. 146, and further, and this is important, our Belgian Companies took advantage of a satisfactory year to make more than usually substantial allocations to Reserve.

Taxation, Administration, &c., show an increase of £4,000, due entirely to the addition of 3d. to the standard rate of income-tax imposed by last year's Budget.

The net profit for the year is £427,000, as compared with £437,000 in 1935, but owing to the change in the rate of income-tax, the dividend we now recommend to you of 10%, less tax, will require £422,800, as compared with £429,000 last year, leaving the sum of £4,238 to be added to the Carry Forward.

Before I put the necessary resolutions to the Meeting, I desire to bring to your notice the admirable work of our own Staff at Head Office and of the members of the Staffs of the Companies abroad, with whose fortunes the prosperity of our Association is bound up.

Our Managing Director, Mr. James, is as ever a tower of strength. His intimate knowledge of what in the nature of things is a very complicated business; his unceasing and vigorous application to its affairs, and his popularity with the Staff and with those with whom he comes in contact, constitute an asset of the greatest value. To me, as Chairman, he is indeed an admirable colleague and associate. His subordinates are actuated by the same spirit of co-operation and keenness as he is, and we Stockholders are fortunate in having so excellent a team of workers in our Association.

To our colleagues and officers in Belgium and in France we owe a debt of gratitude for their skilled and assiduous attention to, and care of, our interests. You will, I am sure, wish me to convey from you to them a message of appreciation for their efforts on your behalf.

I now move that the Report of the Directors and the Audited Statement of Accounts for the twelve months ended March 31, 1937, already printed and circulated amongst the Proprietors, be adopted, and that a Final Ordinary Dividend on the £5,600,000 Capital Stock be paid on May 29, 1937, for the year ended March 31, 1937, to Proprietors registered in the Books at the close of business on May 10, 1937, at the rate of 6% (actual), less Income-Tax at 5s. in the £, making, with the Interim Dividend of 4% (actual), less Income-Tax, paid on Nov. 14, 1936, a Dividend at the rate of 10%, less tax, for the year.

The above resolution was seconded by the Rt. Hon. Sir GUY FLEETWOOD WILSON, G.C.I.E., K.C.B., K.C.M.G., and was carried unanimously.

A resolution proposing the re-election to the Board of the Rt. Hon. Sir Francis O. Lindley, G.C.M.G., C.B., C.B.E., Mr. H. G. Palmer, and Mr. S. H. Le Roy-Lewis, was moved by the CHAIRMAN, seconded by Sir GEORGE JESSEL, Bt., M.C., and carried unanimously.

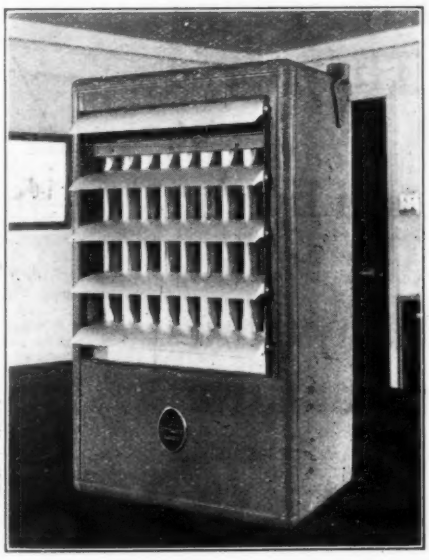
On the motion of Mr. A. C. WHITMEE, seconded by Mr. JOHN E. LLOYD, Proprietors, Messrs. George A. Touche & Co. were re-elected Auditors for the ensuing year at a fee of Two Hundred and Fifty Guineas.

The proceedings terminated with a vote of thanks to the Chairman, the Board, and the officers of the Company.

Trade Notes

A New Suspension Heater.

Abair Engineering, Ltd., of 1, Devonshire Square, London, E.C. 2, announce that they are now marketing in this country the Bryant suspension heater, which has proved very successful in America. To the well-known advantages of suspension unit air heaters, such as small space requirements and high efficiency, have been added special features to make a unit which, it is suggested, should open up a much wider field for these appliances.



The Bryant Unit Heater.

The smallest unit has an output capacity of 68,000 B.Th.U. per hour, and double and triple units consist of two and three of the single units respectively, assembled in one casing. By this means the high efficiency of the single unit is maintained for the higher outputs, and as each unit can be adjusted to deflect air in different directions (horizontally or vertically), heat can be distributed in the most favourable manner. There is a special sequence starting arrangement on the fans of the multiple units.

These units are very quiet. They are of excellent appearance and finished in a special dark blue crackle enamel contrasting with the exposed metal parts, which are in a heat-resisting aluminium finish or plated. The flue outlet and baffle are built into the unit and thus very little head room is required, and the appearance of the installation is not marred by draught hood and flue connections. These qualities enable the heater to be used in situations where noise, appearance, and head room are of importance. The units circulate a large volume of air, but in spite of this the current consumption is low. Units are 3 ft. high and 22 in., 42 in., and 62 in. wide, respectively, in the three sizes, with a depth of 13 in. over the heater proper and 27½ in. over heater and controls. The combustion chamber is in cast iron and the stream-lined heating tubes are of chrome steel alloy. Safety and operating controls are provided.

This new heater is designed for use in shops, offices, public buildings, and other places where good appearance and quiet operation are essential. The large capacity of the multiple units and their dependable performance make them, nevertheless, eminently suitable for heating factories, warehouses, and garages (for which a special safety model is available).

Automatic Lubrication.

We have received from the Menno Compressed Air Greasecup Company, Ltd., a description of their improved Menno cup for the provision of automatic lubrication. This recent development follows as a result of 25 years' specialized service in this branch of engineering. The advantages claimed embrace simplicity in fitting and operation, application of automatic feed to isolated bearings, reliable automatic feed to maintain a constant film of lubricant between journal and bearing, elimination of wear, with consequent saving in cost of overhaul and repairs, and economy in time for attention, and in consumption of lubricant. Such contributory factors towards a general reduction in costs of maintenance will be appreciated by those engineers responsible for public services. Copies of this descriptive leaflet may be obtained on application to the Company at Leeds Place, Tollington Park, London, N. 4.

(*Further Trade Notes on page* 645.)

Simmance Patent

DEAD-BEAT INDICATORS

are especially suitable for use on Gas Works, and are available in ranges of vacuum and pressure to meet practically every requirement. They have been installed by most Gas Engineers and by the leading Gas Plant Manufacturers, and many thousands are in constant use.

ALEXANDER WRIGHT & CO LTD
1, WESTMINSTER PALACE GARDENS, VICTORIA ST.
Telephone: VICTORIA 1207
WESTMINSTER, S.W.1
Telegrams: Precision, Sowest London

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Despite the concessions made last week by Mr. Chamberlain in his National Defence Contribution proposals the remaining uncertainty regarding the incidence of the tax had a restricting effect on Stock Exchange business in many sections. The N.D.C., however, has not been the only cloud on the horizon during the past few weeks. Labour unrest has played an important part in checking a return to more active conditions, but these happily are now disappearing so that when the effects of the N.D.C. are fully understood, and there appears every reason to believe that these will not be so drastic as at first thought, markets will be ripe for a quick recovery. Home rails, which will not be affected by the N.D.C., and other high-class investment securities were the most active last week and prices responded accordingly.

Gas stocks and shares came well into the picture, the volume of business being heavier than for some time past. Prices were hardening towards the close and here and there some increase in the quotation appeared justified though this did not materialize. Gas Light units, Imperial Continental, and the shares of the leading Corporations were all strongly supported, but Severn Valley was the only one to move up, closing 6d. higher at 22s. Wandsworth ordinary improved a point, and at the Provincial Exchanges Bristol closed 1½ points higher at 116½ and Sheffield rose 1 point. Newcastle units, however, reacted 6d. to 25s. 6d. In the Unofficial List the only change of note was a fall of 6 in Wakefield ordinary to 128½, business being recorded at 130.

Sir Thomas Royden's speech at the annual meeting of the Imperial Continental Gas Association, which appears elsewhere in this issue, indicates that in the absence of political interference both at home and abroad the earnings for the current year should be maintained. With the exception of the revenue from French investments, which continue to cause anxiety, the position with regard to the Company's activities at home and in Belgium are very encouraging. He estimated that the revenue from home sources would increase from £62,200 to £102,000 this year which should go far to compensate for any reduction in the revenue derived from France.

Current Sales of Gas Products

The London Market for Tar Products.

LONDON, *May* 31.

To-day's prices for Tar Products are as under:
Pitch, 36s. to 37s. per ton f.o.b.
Creosote, 6d.
Refined tar, 3¾d.
Pure toluole, 2s. 6d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 8s., all per gallon naked at makers' works.

Tar Products in the Provinces.

May 31.

The average prices of gas-works products during the week were: Gas-works tar, 22s. 6d. to 27s. 6d. Pitch—East Coast, 35s. to 36s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 36s.* Toluole, naked, North, 2s. to 2s. 1d. Coal tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 6¼d. to 1s. 6½d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅝d. to 4½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 2s. 7½d. to 2s. 10½d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4⅝d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *May* 29.

Business is still limited for want of prompt supplies. Prices are well maintained in all departments.

Crude gas-works tar.—The actual value is now 37s. to 38s. per ton *ex* works in bulk.

Pitch.—Business is still confined to small quantities, value being 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Throughput is disappointing although makers are holding prices at round 3d. to 3½d. per gallon free on rails for export, and 3½d. to 3⅝d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—Production is well looked after and prices are steady as under: Specification oil, 5½d. to 5⅝d. per gallon; low gravity, 5⅝d. to 6d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—With available supplies strictly limited values are well held. The following prices can only be taken as approximate: Pale, 97/99%, 4s. 5d. to 4s. 7d. per gallon; dark, 97/99%, 4s. 2d. to 4s. 4d. per gallon; and pale, 99/100%, 4s. 10d. to 5s. 1d. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—There is a steady demand at 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha continues quite active with 90/160 grade at 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha at 11d. to 1s. per gallon.

Motor benzole is unchanged at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—Prices are nominal at 7s. to 8s. per gallon for 90/160 grade, and 8s. to 9s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 10	to	0 10½	per gallon at works
Motor ,, . . .	1 3¾	,,	1 4	,, ,, ,,
90% ,, . . .	1 4½	,,	1 5	,, ,, ,,
Pure ,, . . .	1 8½	,,	1 9	,, ,, ,,

Contracts Advertised To-Day

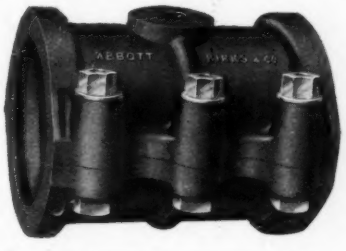
Coal.

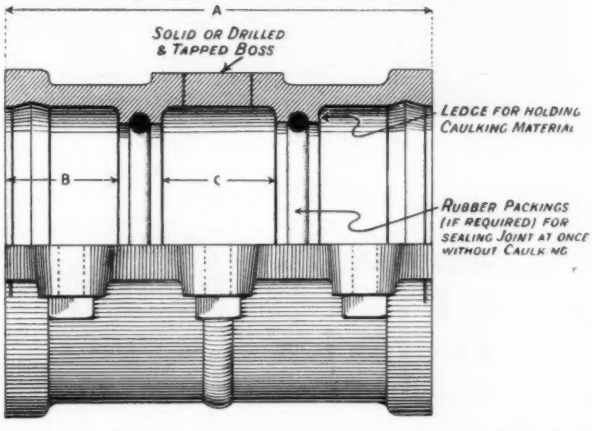
Droitwich Gas Department. [p. 650.]
Shipley Gas Department. [p. 650.]
Sleaford Gas Company. [p. 649.]
Teignmouth Gas Department. [p. 649.]

Further Trade Notes

The New "Edwin" Split Collar.

The accompanying illustrations show the general principles of the new "Edwin" split collar, manufactured by Abbott, Birks, & Co., Ltd., of 90-91, Blackfriars Road, London, S.E. 1, for quick and effective repairs or for reinforcement of branch service connections on gas or water mains. The rubber ring packings gripped in annular grooves immediately produce a sealed joint, to which caulking can be applied afterwards safely and easily under full pressure. The internal ledge provides a



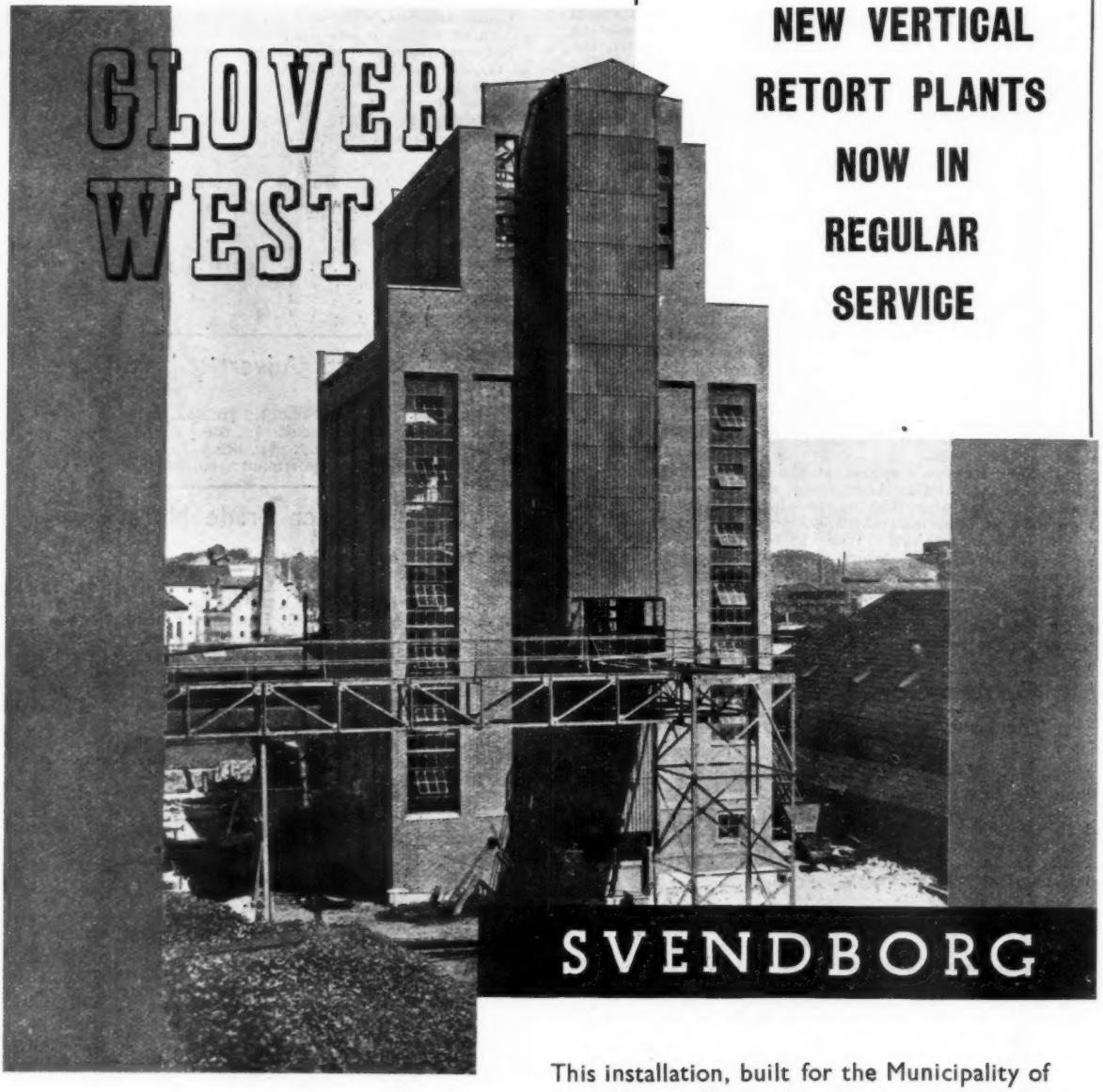

A
SOLID OR DRILLED & TAPPED BOSS
LEDGE FOR HOLDING CAULKING MATERIAL
B
C
RUBBER PACKINGS (IF REQUIRED) FOR SEALING JOINT AT ONCE WITHOUT CAULKING

firm base for yarning and caulking, thus reducing wastage of time and material and preventing obstruction of the gas or water way in the case of branches. The nuts are readily accessible, no special spanner being required, while when the rubber rings are used the collar is held evenly and firmly on the main, obviating the need for a second man while caulking.

Among other advantages of this device, it may be mentioned that where a main is fractured at a service connection the old tapping can be utilized. In the case of water mains the pressure can be turned on immediately the nuts are tightened.

GLOVER WEST

NEW VERTICAL RETORT PLANTS NOW IN REGULAR SERVICE



SVENDBORG

This installation, built for the Municipality of Svendborg, Denmark, is an interesting example of the modern Glover-West vertical retort plant designed for the smaller works. It is an eight-retort unit with fuel-gas producers equipped for breeze-burning, waste-heat recovery plant and electric lift. Coaling is by means of an automatic skip-hoist.

400 plants in 24 countries

THE SOCIETY OF BRITISH GAS INDUSTRIES · 1905 ·

WEST'S GAS IMPROVEMENT CO., LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING ■ LONDON: COLUMBIA HOUSE, ALDWYCH, W.C. 2

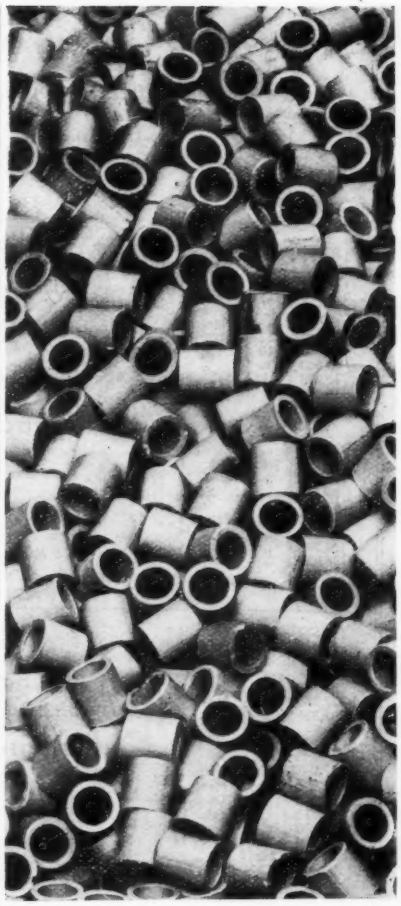
STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations May '28.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 15	8	8	Alliance & Dublin Ord. ...	170—175	...	...
374,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
558,890	,,	Feb. 15	7	7	Barnet Ord. 7 p.c.	160—165	...	...
300,000	1	Apl. 5	1/4⅓	1/9⅔	Bombay, Ltd.	25/6—27/6	...	26/-
179,915	Stk.	Mar. 1	9½	9½	Bournemouth sliding scale ...	195—205	...	...
590,407	,,	,,	7	-	Do. 7 p.c. max. ...	161—166	...	163—163¾
493,960	,,	,,	6	6	Do. 6 p.c. Pref ...	133—138	...	133½
50,000	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	80—85	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	121—122¼
357,900	,,	Feb. 15	7½	7½	Brighton, &c., 6 p.c. Con. ...	155—160	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	138—143	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	130—135	...	135
855,000	,,	Mar. 1	7	8	British Ord.	148—153	...	152½
100,000	,,	Dec. 14	7	7	Do. 7 p.c. Pref.	143—148	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	97
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3½	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	120—125	...	...
237,860	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
98,936	1	Apl. 5	2/-	2/-	Colombo Ord.	1⅞—1⅞	...	...
24,510	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	23/—25/-	...	...
739,453	1	Mar. 15	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	17/6
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	23/9
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	88—93	...	91½—92
620,000	,,	Nov. 30	3	3	Do. 3 p.c. Deb. ...	73—78	...	76—76½
286,344	,,	Feb. 15	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
807,560	,,	Feb. 15	7	7	Croydon sliding scale ...	142—147	...	145½—147
644,590	,,	,,	5	5	Do. max. div.	109—114	...	110—111½
620,385	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	115—120	...	...
239,000	,,	Feb. 1	5	5	East Hull Ord. 5 p.c.... ...	100—105	...	101½—102½
185,355	,,	Feb. 15	6	6	East Surrey Ord. 5 p.c. ...	122—127	...	120
176,211	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	113—118	...	115½
250,000	1	Nov. 16	6	4	Gas Consolidation Ord. ...	20/—22/-	...	...
250,000	1	May 24	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-*	...	...
19,255,284	Stk.	Feb. 1	5½	5½	Gas Light & Coke 4 p.c. Ord.	25/3—26/3a	...	25/4½—25/10½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	80—83	...	81½—82
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103	...	101—103
8,602,497	,,	May 24	3	3	Do. 3 p.c. Con. Deb. ...	80—83*	...	81—82½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—113*	—½	113
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	108—111*	—1	108½—111
700,000	,,	Mar. 1	25/5⅝	3¼	Do. 3¼ p.c. Red. Deb....	98—101	...	99½—100½
270,466	,,	Feb. 15	6	6	Harrogate New Cons. ...	122—127	...	...
213,200	,,	Feb. 15	6	6	Hornsey Con. 3½ p.c. ...	120—125	...	...
5,600,000	,,	May 24	8	12	Imperial Continental Cap. ...	157—162*	—3	158—163
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...	92½
285,242	,,	Mar. 1	8⅓	8⅓	Lea Bridge 5 p.c. Ord. ...	160—165	...	...
11,751	,,	Mar. 1	8	10	Maidstone Gas 5 p.c. Cap. Stk.	180—190	...	...
63,480	,,	Dec. 14	3	3	Do. 3 p.c.Prp.Db.Sk.	72—77	...	...
75,000	,,	May 24	†10	†10	Malta & Mediterranean ...	150—160*	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	101
231,978	Stk.	Feb. 15	5	5	M.S. Utility 'C' Cons. ...	102—107	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	98
360,075	,,	Dec 14	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	Jan. 4	3½	3½	Do. 3½ p.c. Rd.Rg.Bds.	97—100	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	85—90	...	87½—89
250,000	,,	Feb. 15	7½	7½	North Middlesex 6 p.c. Con.	152—157	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	102—107	...	...
300,000	,,	Apl. 19	†9	†7	Oriental, Ltd....	162—167	...	165—166
416,617	,,	Dec. 14	8	8	Plymouth & Stonehouse 5 p.c.	165—170	...	...
621,667	,,	Feb. 15	8½	8½	Portsmouth & Gosport Cons.	167—172	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	112—117	...	...
441,275	1	May 3	1/-	1/1⅛	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	+-/6	22.3—22.9
460,810	1	Mar. 15	-/10⅛	-/10⅝	,, ,, 4½ p.c. Cum. Pref.	20/—22/-	..	...
133,201	Stk.	Feb. 15	5	8⅓	Shrewsbury 5 p.c. Ord. ...	140—145	...	...
90,000	10	June 8	‡3⅓	‡4	South African...	4—5	...	...
1,371,752	1	May 3	1/2⅔	1/2⅔	South East'n Gas. Cn.Ld. Ord.	24-/—26/-	...	24/9—25.6
871,636	1	Mar. 1	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	20.9—22/-
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	19/6—21/6	...	19/6—20/-
450,000	,,	Feb. 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
150,000	Stk.	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	107—110	...	108½—109½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	132—137	...	132—133
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	97—100	...	99—100
1,895,445	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	75—80	+1	77½—80
1,000,000	,,	Jan. 4	5	5	Do. 5 p.c. Red. Deb....	107—112	...	...
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	122—127	...	124
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	112—117	...	114—115½
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	...
888,587	,,	Dec. 14	5	5	Do. 5 p.c. Deb....	115—120	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	98—103	...	...
427,859	1	May 3	9⅔	1/2⅔	S. Western Gas & Water Ord.	19/—21/-	...	...
160,523	1	Apl. 19	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	21/-
110,000	Stk.	Dec. 14	4	4	Do. 4 p.c. Red. Deb. ...	98—103	...	...
750,541	,,	Feb. 1	5	5⅓	Southampton Ord. 5 p.c. ...	111—116	...	...
148,836	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	98—103	...	...
350,000	,,	Feb. 15	5⅓	5⅓	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
106,000	,,	Jan. 4	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	...
94,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	96⅔
1,076,490	,,	Feb. 15	6⅔	6⅔	Tottenham and District Ord.	137—142	...	...
409,835	,,	,,	5⅓	5⅓	Do. 5½ p.c. Pref....	123—128	...	125
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
371,850	,,	Nov. 30	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
373,939	,,	Feb. 15	7	7	Uxbridge, &c., 5 p.c. ...	142—147	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,371,138	,,	Feb. 1	7	7	Wandsworth Consolidated ...	143—148	+1	145⅔—147
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref ...	113—118	...	...
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	95—100	...	99—99½
1,343,964	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
558,342	,,	Feb. 1	7	7	Watford and St. Albans Ord.	142—147	...	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	114½
200,000	,,	,,	5⅔	5⅔	Do. 5⅔ p.c. Pref. ...	123—128	...	...
200,000	,,	Dec. 14	4	4	Do. 4 p.c. Red. Deb.	97—102	...	...
100,000	,,	,,	3⅓	3⅓	Do. 3⅓ p.c. Red.Deb.	95—100	...	...

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.



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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. May 28.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	121—123	...	...
1,667,250	,,	Feb. 15	5	5	Bristol, 5 p.c. max.	116—117	+1½	...
120,420	,,	Dec. 14	4	4	Do. 1st 4 p.c. Deb. ...	101—103	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101—103	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—125	...	...
274,000	,,	Mar.	5	5	Newport (Mon.) 5 p.c.max. ...	103—108	...	...
13,200	12	Mar. 15	7	8	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	5	6	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C'	12—12½	...	...
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	112—113	...	...
64,338	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	98—101	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	160—163	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	106—111	...	...
92,500	,,	Dec. 14	4½	4	Do. 4 p.c. Pref.	98—102	...	...
36,430	,,	,,	3	3½	Do. 3½ p.c. Deb....	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Feb. 15	6	6	Liverpool 5 p.c. Ord. ...	125½—127½	...	...
245,500	,,	Dec. 14	5	5	Do. 5 p.c. Red. Pref. ...	101—106	...	...
306,083	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	103—105	...	...
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	210—220	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	150—160	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Feb. 15	5	5	Hartlepool G. & W. Cn. & New	124—126	−1	...
2,061,315	,,	Feb. 1	5	5½	Newcastle & Gateshead Con.	25/3—25 9*a*	−/6	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—102	...	...
776,706	,,	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	93—94	...	...
277,285	,,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
332,351	,,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Mar. 1	7	9	Derby Con.	155—175	...	...
55,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	Dec. 14	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Feb. 15	6	6½	Sheffield Cons.	144—146	+1	...
95,000	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	101—104	...	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Mar. 15	25/-*b*	25/-*b*	Ascot Ord.	102—107	...	...
128,182	,,	Jan. 4	5	5	Do. 5 p.c. Pref.	110—115	...	...
312,083	1	May 24	5	5	Assd. Gas and Water Ord. ...	19/6—21/6*	...	20/6—21/4½
326,071	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	19/6—21/6*	...	...
150,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	97¼—97¾
17,000	,,	Feb. 15	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	195—205	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	137—142	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Mar. 1	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	...
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	130—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
130,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	[116—117½
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	45—50	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	40—45	...	...
51,160	Stk.	Dec. 14	5½	5½	Do. 5½ p.c. Deb.	122—127	...	...
152,600	,,	Feb. 15	8	9	Guildford Cons.	190—200	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	...
68,250	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	...
156,600	,,	Feb. 15	7½	7½	Hampton Court Cons. ...	150—155	−2½	153½—155
107,960	10	Mar. 15	4	5½	Mid Kent Ord.	9—10	...	...
230,940	Stk.	Feb. 15	10	10	Oxford & District Ord. ...	200—210	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	112—117	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169*	...	...
64,990	,,	Mar. 15	6½	7½	Redditch Ord.	127—137	...	...
166,850	,,	Feb. 15	8	8	Romford Ord.	157—167	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 15	5	5½	Do. 5 p.c. Deb.	115—120	...	...
10,950	,,	Mar. 1	8	8½	Ryde Ord.	160—165	...	...
136,191	,,	Feb. 15	5	7	Scarborough Ord.	123—133	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Mar. 15	7	7	Slough Ord.	137—142	...	...
21,000	,,	Dec. 14	5	5½	Do. 5 p.c. Deb.... ...	113—118	...	...
28,872	1	May 24	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-*	−/6	...
28,866	1	Mar. 15	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Feb. 15	7	7¼	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5½	Do. 5 p.c. Pref.	110—115	...	114
117,228	,,	Feb. 15	6	5½	Swindon Cons.	108—113	...	...
60,425	,,	Dec. 14	5	5½	Do. 5 p.c. Deb.	113—118	...	...
64,380	,,	Dec. 14	5	5½	Torquay and Paignton 5 p.c. Pf.	115—120	...	...
750,000	1	Apl. 5	4	6	Utd. Kingdom Gas Cpn. Ord.	20/6—22/6	...	21/7½—22/3
936,338	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	21/3—21/9
674,084	1	Apl. 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pref.... ...	18/—20/-	...	18/3
600,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	97¾
130,000	,,	Feb. 15	5	8	Wakefield Ord.	126—131	−6	130
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130	...	...
160,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Rd. Db	110—115	...	...
370,000	,,	Feb. 15	4	6½	York Cons.	105—110	...	...
90,000	,,	Dec. 14	5	5¾	Do. 5 p.c. Red. Deb. ...	105—110	...	...
133,640	,,	Mar. 1	6¼	6¼	Yorktown (Cam.) 5 p.c ons.	130—135	...	...
120,000	,,	,,	5	5¼	Do. 5 p.c. Pref.	110—115	...	...
35,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Deb.... ...	125—130	...	...

a The quotation per £1 of Stock *b* Actual for Quarter. * Ex div.

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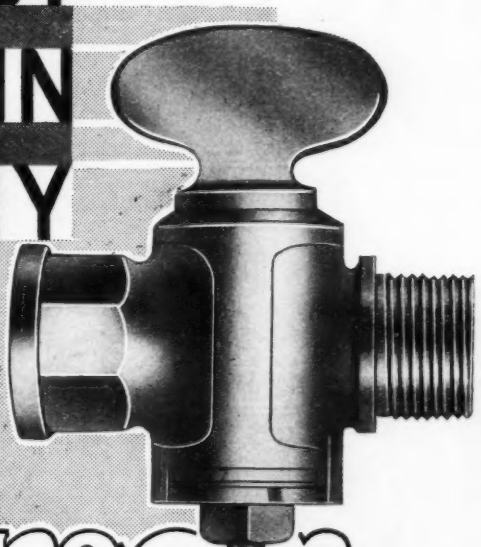

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